A Complete Guide to ...

Measurement

Utilising the objectives as written in

MATHEMATICS in the New Zealand CURRICULUM

for

Level 5

This resource contains:

- ☑ Table of contents
- ☑ Teaching notes
- ☑ In class activity sheets involving
  - ▫ worked examples
  - ▫ basic skills
  - ▫ word problems
  - ▫ problem solving
  - ▫ group work
- ☑ Homework / Assessment activity sheets
- ☑ Answers

These resources are supplied as PHOTOCOPY MASTERS

Author: A. W. Stark

AWS Publications Ltd
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AWS Teacher Resources

L5MM

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Note from the author:

This resource ...

*A Complete Guide to Measurement

is one of a series of **FIVE** resources written utilising the objectives as stated in

Mathematics in the New Zealand Curriculum for Level 5.

With my experiences as a specialist mathematics teacher, I enjoyed mathematics as a subject, but I am aware that not all teachers feel the same way about mathematics. It can be a difficult subject to teach, especially if you are unsure of the content or curriculum and if resources are limited.

This series of resources has been written with you in mind. I am sure you will find this resource easy to use and of benefit to you and your class.

Resources in this series:

A Complete Guide to Number
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 5.
Resource Code: L5MN

***A Complete Guide to Measurement**
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 5.
Resource Code: L5MM

A Complete Guide to Geometry
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 5.
Resource Code: L5MG

A Complete Guide to Algebra
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 5.
Resource Code: L5MA

A Complete Guide to Statistics
written utilising the objectives as stated in
Mathematics in the New Zealand Curriculum for Level 5.
Resource Code: L5MS

For more information about these and other resources, please contact ...

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Acknowledgement:

I would like to thank the staff and pupils of **Mairehau Primary School, Christchurch** for their assistance in making these resources possible.

This resource has been divided into EIGHT sections as listed below.

Although there are no page numbers, the sections follow in sequential order as listed.

Note: **'In-class' Worksheets Masters** are lesson by lesson reuseable worksheets that can be photocopied or copied on to an OHP.

Homework / **Assessment Worksheets Masters** can be used as homework to reinforce work covered in class or they can be used for pupil assessment.

1 Measurement

The following are the objectives for **Measurement**, **Level 5**, as written in the **MATHEMATICS** *in the New Zealand Curriculum* document, first published 1992. ***[REFER PAGE 74]***

Estimating and measuring

Within a range of meaningful contexts, students should be able to:

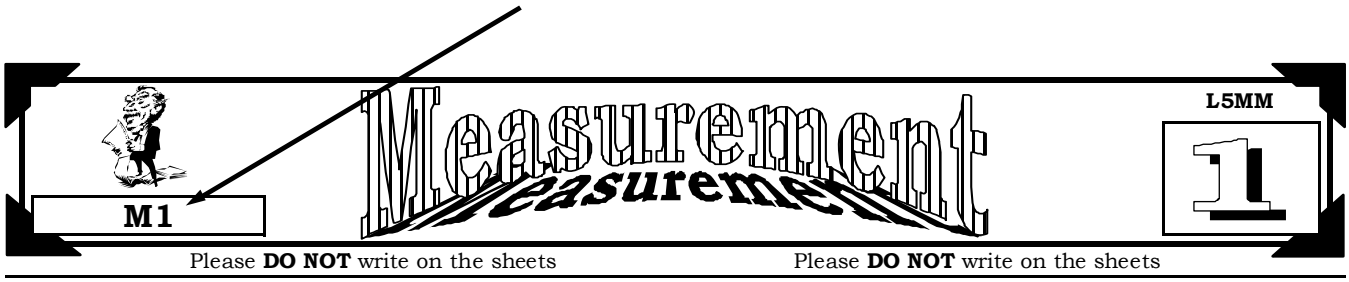
- **M1** find perimeter, areas and volume of everyday objects (including irregular and composite shapes) and state the precision (limits) of the answer;
- **M2** design and use models to solve measuring problems in practical contexts.

Developing concepts of time, rate and change

Within a range of meaningful contexts, students should be able to:

- **M3** interpret and use information about rates presented in a variety of ways, for example, graphically, numerically, or in tables.

At the top of each **'In-class' worksheet** and **Homework / Assessment worksheet**, the Measurement objective(s) being covered has been indicated. *EXAMPLE:* **M1** means objective 1, **M2** means objective 2, etc.



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The **Mathematical Processes Skills:** **Problem Solving**, **Developing Logic & Reasoning,** **Communicating Mathematical Ideas,** are learned and assessed within the context of the more specific knowledge and skills of number, measurement, geometry, algebra and statistics. The following are the **Mathematical Processes Objectives** for **Level 5**.

Problem Solving Achievement Objectives ***[Refer page 24]***

- **MP1** pose questions for mathematical exploration;
- **MP2** effectively plan mathematical exploration;
- **MP3** devise and use problem-solving strategies to explore situations mathematically;
- **MP4** find, and use with justification, a mathematical model as a problem-solving strategy;
- **MP6** use equipment appropriately when exploring mathematical ideas.

Developing Logic and Reasoning Achievement Objectives ***[Refer page 26]***

- **MP8** classify objects, numbers and ideas;
- **MP9** interpret information and results in context;
- **MP10** make conjectures in a mathematical context;
- **MP11** generalise mathematical ideas and conjectures;
- **MP15** use words and symbols to describe and generalise patterns.

Communicating Mathematical Ideas Achievement Objectives ***[Refer page 28]***

- **MP16** use their own language and mathematical language and diagrams to explain mathematical ideas;
- **MP17** devise and follow a set of instructions to carry out a mathematical activity;
- **MP20** record information in ways that are helpful for drawing conclusions and making generalisations;
- **MP21** report the results of mathematical explorations concisely and coherently.

Note:
The codes **MP1**, **MP2**, etc. have been created by numbering the **Mathematical Processes Achievement Objectives** in order as listed in the **MATHEMATICS** *in the New Zealand Curriculum* document. The numbering gaps occur as not all objectives are covered at **Level 5**. ***[REFER TO PAGES 23 - 29 OF THE CURRICULUM DOCUMENT]***

‘In-class’ Measurement Worksheets
Table of Worksheet Number / Objectives Covered

See the opposite page for details of each objective.

	Measurement Objectives				Mathematical Processes Objectives												
Worksheet Number	R	M1	M2	M3	MP 1	MP 2	MP 3	MP 4	MP 6	MP 8	MP 9	MP 10	MP 11	MP 15	MP 16	MP 17	MP 20	MP 21
1	✖						✖				✖							
2	✖				✖		✖				✖							
3	✖						✖				✖							
4	✖				✖		✖				✖							
5	✖						✖				✖							
6	✖				✖		✖				✖							
7		✖					✖				✖							
8		✖							✖		✖						✖	
9		✖			✖		✖		✖		✖				✖			
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11		✖			✖	✖			✖		✖					✖		
12		✖			✖		✖		✖		✖					✖		
13		✖	✖		✖		✖				✖		✖					
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15		✖	✖		✖		✖				✖		✖					
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18		✖	✖		✖		✖				✖		✖			✖		
19		✖	✖		✖		✖				✖		✖			✖		
20	✖				✖		✖				✖					✖		
21	✖						✖				✖							
22	✖						✖				✖					✖		
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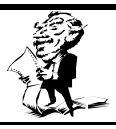
Table of Contents for the 'In-class' Worksheet Masters for Measurement, Level 5



Revision

Measurement

Please **DO NOT** write on the sheets Please **DO NOT** write on the sheets

Units / conversions associated with length:

In New Zealand, the **Metric system** is the measuring system we use.
The **basic unit** for **measuring length** is the **metre**.

The other most common units of length measurement are listed in this table. Depending on what you are measuring, one unit will be more suitable than another.

Example: What units would you use to measure the distance between two cities, the thickness of a match or the height of a door? Answers: km, mm and m.

kilometre	1000 times longer than a metre
metre	standard unit for length
centimetre	100 times shorter than a metre
millimetre	1000 times shorter than a metre

Task 1

Which unit of measurement, **kilometre**, **centimetre**, **metre** or **millimetre** would be best to measure ...

1. the thickness of a text book?
2. the width of a rugby field?
3. the distance between two towns?
4. the height of a lamp post?
5. your height?
6. the length of the classroom?
7. the distance of a running race?
8. the length of your shortest finger?
9. the thickness of a pen?
10. the height of a tree?

11. For each of the metric length units above, **list** 3 more items suitable to be measured by that unit.

The ability to convert between units is an important skill.
Copy each question and replace the ◆ with a number as you **convert** the following ...

12.	1cm = ◆ mm	13.	10mm = ◆ cm	14.	9cm = ◆ mm	15.	30mm = ◆ cm
16.	40mm = ◆ cm	17.	67mm = ◆ cm	18.	243mm = ◆ cm	19.	361mm = ◆ cm
20.	4.5cm = ◆ mm	21.	8.3cm = ◆ mm	22.	15.6cm = ◆ mm	23.	41.6cm = ◆ mm
24.	1m = ◆ mm	25.	1m = ◆ cm	26.	6m = ◆ cm	27.	9m = ◆ mm
28.	190cm = ◆ m	29.	345cm = ◆ m	30.	954cm = ◆ m	31.	465cm = ◆ m
32.	1400mm = ◆ m	33.	7105mm = ◆ m	34.	3456mm = ◆ m	35.	1720mm = ◆ m
36.	1km = ◆ m	37.	1000m = ◆ km	38.	3500m = ◆ km	39.	5260m = ◆ km
40.	4.68km = ◆ m	41.	8650m = ◆ km	42.	3.75km = ◆ m	43.	6.042km = ◆ m
44.	69.3km = ◆ m	45.	905m = ◆ km	46.	14.56km = ◆ m	47.	0.785km = ◆ m

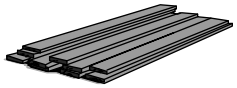
48. A length of material measured 167cm. Convert this length to metres.
49. The school cross-country race is 3.2km. Convert this distance to metres.

50. The distance between two plates on a table is 34.6cm. Convert this distance to millimetres.
51. A piece of wood is 2.75m long. Convert this length to centimetres.
52. A stack of paper measured 0.65m. Convert this height to centimetres.
53. The length of a bus is 0.0095km. Convert this length to metres.
54. The height of a small tree is 1208cm. Convert this height to metres.

55. The cross-country mountain bike race is 12500m. Convert this distance to kilometres.
56. The height of a cupboard is 1.05m. Convert this height to millimetres.
57. The height of Jodie is 1426mm. Convert this height to metres.

58. **Create** 10 conversion questions as above.
Exchange questions with a classmate and complete the conversions.

Calculations involving mixed length units:



Example: Shane has two pieces of wood. One is 85cm long the other is 2.1m.
What is the total length of wood that Shane has?

Is the answer as simple as adding 85 and 2.1 together?

To be able to add these two length measurements, the units must be the same.
One of the measurement values must be converted, so that both units are the same.

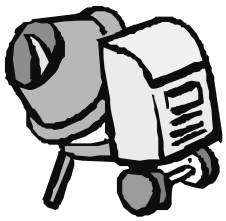
Example: We can answer in metres, ... 85cm = 0.85m, therefore 0.85m + 2.1m = 2.95m,
or we can answer in centimetres, ... 2.1m = 210cm, therefore 85cm + 210cm = 295cm.

Answer: Shane has 2.95m or 295cm of wood.

Task 2

Copy each question. **Answer** in the unit indicated in the brackets. **All** measurement units must be in the same unit before adding or subtracting.

1.	539mm + 11.7cm = ◆ (cm)	2.	6.1cm – 49mm = ◆ (mm)	3.	3.79m + 169cm = ◆ (m)
4.	7.125km – 3653m = ◆ (km)	5.	1.439m + 7859mm = ◆ (m)	6.	373mm – 4.79cm = ◆ (cm)
7.	639cm + 3.95m = ◆ (m)	8.	7450m – 5.326km = ◆ (km)	9.	9.36m + 587cm = ◆ (m)
10.	795mm – 4.96cm = ◆ (mm)	11.	11.93km + 2745m = ◆ (m)	12.	92.9cm – 0.485m = ◆ (cm)
13.	915m + 7.926km = ◆ (m)	14.	158mm – 7.94cm = ◆ (cm)	15.	4.195m + 1735mm = ◆ (mm)



Mr Jones is building a brick fence using bricks that are 40cm long.

16. If the length of the fence is 24m, how many bricks are needed for each layer of the fence?
17. How many bricks are needed to build a fence made up of 8 layers?
18. If the bricks cost 35 cents each, how much will all the bricks cost? Give your answer in dollars.

Mrs Proctor is going to recover a chair. She has worked out that she needs pieces of material that measure 1.65m, 85cm, 68cm and 1.53m in length.

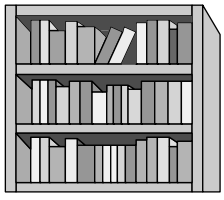
19. Calculate the total length of material she needs. Give your answer in metres.
20. If the material costs $13.85 per metre, what is the total cost of the material?

Jim runs around a local park each morning. The distance of each lap is 1200m.

21. How many metres would Jim run, if he ran 3 laps? Convert your answer to kilometres.
22. How many laps will he need to run to complete a distance of 4.8km?

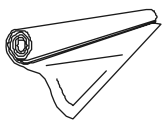
Last week he ran 5 laps, 7 laps, 6 laps, 7 laps, 12 laps, 4 laps and 9 laps during his morning runs.

23. How many laps did he run last week?
24. Calculate the total distance of his runs, stating your answer in both metres and kilometres.



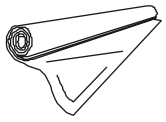
Rangi is going to build a new book shelf. The book shelf is 840mm high and each shelf is 1.2m long. This diagram shows what the book shelf will look like when finished.

25. Calculate the total length of wood needed to build the book shelf. Answer in metres.
26. If the wood costs $7.85 per metre, what is the cost of buying the wood?



David has measured and cut the following lengths of wallpaper for part of the bedroom walls ...
205cm, 2050mm, 185cm, 750mm, 1.6m, 2.05m and 1.75m.

27. What is the total length of wallpaper he has cut so far? Answer in metres, centimetres and millimetres.
28. If one roll of wallpaper contains 5 metres of paper, how many rolls has David used so far?
29. If each roll costs $13.25, how much has he spent so far?



30. **Make up** some similar word questions as above that you can exchange with a classmate.

Revision

Measurement

3

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Units / conversions associated with mass (weight):

The **basic unit** for **measuring mass** is the **gram**.
The mass of an object is often referred to as its weight.

The other most common units of mass measurement are listed in this table. Depending on what you are measuring, one unit will be more suitable than another.

Example: What units would you use to measure the weight of a piece of paper, the mass of a car and the weight of a person? Answers: mg, t and kg.

tonne	1000 times heavier than a kilogram
kilogram	1000 times heavier than a gram
gram	standard unit for mass
milligram	1000 times lighter than a gram

Task 3

Which unit of measurement, **tonne**, **kilogram**, **gram** or **milligram** would be best to measure ...

1. the weight of a truck?
2. the weight of a feather?
3. the weight of a horse?
4. the weight of a building?
5. your weight?
6. the weight of a packet of biscuits?
7. the weight of a potato chip?
8. the weight of a pen?
9. the weight of apples on a tree?
10. the weight of a piece of tissue paper?

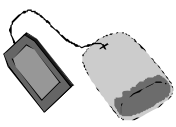
11. For each of the metric mass units above, **list** 3 more items suitable to be measured by that unit.

The ability to convert between units is an important skill.
Copy each question and replace the ◆ with a number as you **convert** the following ...

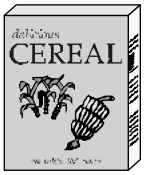
12.	1g = ◆ mg	13.	1000mg = ◆ g	14.	9g = ◆ mg	15.	8000mg = ◆ g
16.	4.9g = ◆ mg	17.	8.1g = ◆ mg	18.	2.78g = ◆ mg	19.	43.6g = ◆ mg
20.	635mg = ◆ g	21.	975mg = ◆ g	22.	0.424g = ◆ mg	23.	0.963g = ◆ mg
24.	1kg = ◆ g	25.	1000g = ◆ kg	26.	6kg = ◆ g	27.	6.125kg = ◆ g
28.	4.3kg = ◆ g	29.	6600g = ◆ kg	30.	8.35kg = ◆ g	31.	4290g = ◆ kg
32.	1750g = ◆ kg	33.	1.05kg = ◆ g	34.	0.864kg = ◆ g	35.	706g = ◆ kg
36.	1t = ◆ kg	37.	1000kg = ◆ t	38.	2.6t = ◆ kg	39.	5300kg = ◆ t
40.	3.95t = ◆ kg	41.	9.45t = ◆ kg	42.	6.34t = ◆ kg	43.	9.256t = ◆ kg
44.	5715kg = ◆ t	45.	635kg = ◆ t	46.	0.476t = ◆ kg	47.	915kg = ◆ t

48. A piece of wood weighs 5623g. Convert this weight to kilograms.

49. A small cat weighs about 2.05kg. Convert this weight to grams.



50. A car weighs 1.25 tonnes. Convert this weight to kilograms.
51. A piece of concrete weighs 12500kg. Convert this weight to tonnes.
52. A large tea bag weighs 1250mg. Convert this weight to grams.
53. Twenty sheets of cardboard weigh about 2.45g. Convert this weight to milligrams.



54. A pile of bricks weighs about 865kg. Convert this weight to tonnes.
55. A bird's feather weighs 0.023g. Convert this weight to milligrams.

56. 13 bags of potatoes weigh 0.52 tonnes. Convert this weight to kilograms.
57. 18 packets of breakfast cereal weigh 13500g. Convert this weight to kilograms.

58. **Create** 10 conversion questions as above.
Exchange questions with a classmate and work out the conversions.

Calculations involving mixed mass units:

Example: Karen has two bags of rice. One weighs 650g and the other weighs 0.9kg.
What is the total weight of rice that Karen has?

Is the answer as simple as adding 650 and 0.9 together?

To be able to add these two mass (weight) measurements, the units must be the same.
One of the measurement values must be converted, so that both units are the same.

Example: We can answer in grams, ... 0.9kg = 900g, therefore 650 + 900 = 1550g,
or we can answer in kilograms, ... 650g = 0.65kg, therefore 0.65 + 0.9 = 1.55kg.

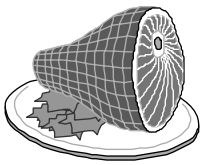
Answer: Tracy has 1550g or 1.55kg of rice.

Task 4

Copy each question. **Convert** all measurements to the same unit before adding or subtracting.
Answer in the units indicated in the brackets.

1.	9.8g + 1525mg = ◆ (mg)	2.	6.32kg – 3260g = ◆ (kg)	3.	6.25t + 4140kg = ◆ (t)
4.	5.36kg – 4208g = ◆ (g)	5.	3.85t + 1750kg = ◆ (kg)	6.	5230mg – 3.57g = ◆ (g)
7.	9.35g + 6420mg = ◆ (g)	8.	9645kg – 4.59t = ◆ (t)	9.	9.48kg + 6424g = ◆ (kg)
10.	7364mg – 5.59g = ◆ (mg)	11.	7.64t + 2065kg = ◆ (kg)	12.	6235kg – 4.8t = ◆ (t)
13.	1.2kg + 6263mg + 75g= ◆ (g)	14.	5740mg – 2.56g = ◆ (mg)	15.	7.015g + 945mg = ◆ (g)

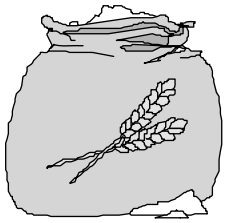
A local butcher shop sells Christmas hams of various sizes.



16. Today 7 hams were sold that weighed 6910g, 5.85kg, 4840g, 4.75kg, 6.34kg, 4529g and 7.15kg. What was the total weight of hams sold today? Answer in kilograms.
17. What was the total for ham sales, if ham sells for $15.90 per kg?

The butcher buys sausages in bulk and packs the sausages in 450g packs.

18. How many 450g packets can be made from 22.5kg of sausages?
19. If packs of sausages sell for $3.95 each, what will be the total sausage sales when all packs are sold?



A bakery buys flour in 40kg sacks.

20. Calculate the weight of flour a bakery goes through if it uses 36 sacks of flour in six months. Answer in tonnes.
21. If a 40kg sack of flour costs $25.60, how much does 1kg of flour cost?
22. If a small bread bun uses 250g of flour, how many small buns can be made from a 40kg sack?
23. Calculate the cost of the flour used in a 250g bun.

A small truck has been used to move large rocks and can carry a maximum load of 1.5 tonnes per load.

24. During the week, loads of rocks weighing 560kg, 1.15t, 1.47t, 954kg, 805kg and 1.12t were transported on the truck. Calculate the total weight of these loads. Answer in kgs.
25. How many maximum loads would it take if this truck is used to move 13500kg of materials?
26. If 7 loads averaging 1.37t were delivered in a week, what is the total weight delivered? Answer in tonnes, then convert your answer to kgs.

Pauline made a batch of 25 biscuits that required 250g of butter and 180g of sugar.

27. Pauline baked a batch of biscuits every week for 12 weeks.
Calculate the weight of butter and sugar she used. Answer in kilograms.
29. If the butter costs $2.75 / 500g, how much did Pauline spend on butter?
28. If the sugar costs $3.10 / kg, how much did she spend on sugar?
30. How many batches of biscuits could she bake if she had 5kg of butter?
31. How many batches of biscuits could she bake if she had 6kg of sugar?

32. **Make up** some similar word questions as above that you can exchange with a classmate.

Units / conversions associated with capacity (volume):

The **basic unit** for **measuring capacity** is the **litre**. The capacity that an object will hold is also called its **volume**.

The other most common units of capacity measurement are listed in this table. Depending on what you are measuring, one unit will be more suitable than another.

kilolitre	1000 times greater capacity than a litre
litre	standard unit for capacity
millilitre	1000 times smaller capacity than a litre

Example: What units could be used to measure the volume of a small bottle, the capacity of a swimming pool and the volume of water in an ocean? Answers: mL, L and kL.

Task 5

Which unit of measurement, **kilolitre**, **litre** or **millilitre** would be best to measure ...

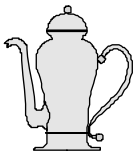
1. the volume of water in a cup?
2. the capacity of a hot water bottle?
3. the volume of air in a room?
4. the capacity of a teapot?
5. the capacity of a teaspoon?
6. the volume of juice in a lemon?
7. the volume of paint needed to paint a wall?
8. the volume of milk in a cow's udder?
9. the capacity of a large petrol storage tank?
10. the capacity of an ice-cream container?

11. For each of the metric capacity units above, **list** 3 more items that can be measured by that unit.

The ability to convert between units is an important skill.
Copy each question and replace the ◆ with a number as you **convert** the following ...

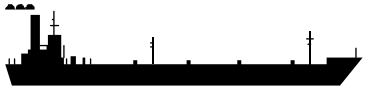
12.	1L = ◆ mL	13.	1000mL = ◆ L	14.	8L = ◆ mL	15.	9000mL = ◆ L
16.	9.6L = ◆ mL	17.	4700mL = ◆ L	18.	1.27L = ◆ mL	19.	2.26L = ◆ mL
20.	526mL = ◆ L	21.	637mL = ◆ L	22.	0.395L = ◆ mL	23.	0.842L = ◆ mL
24.	1kL = ◆ L	25.	1000L = ◆ kL	26.	7kL = ◆ L	27.	3000L = ◆ kL
28.	6.7kL = ◆ L	29.	5200L = ◆ kL	30.	3.65kL = ◆ L	31.	4.015kL = ◆ L
32.	3.09kL = ◆ L	33.	7435L = ◆ kL	34.	0.395kL = ◆ L	35.	532L = ◆ kL
36.	7.014L = ◆ mL	37.	1952L = ◆ kL	38.	8525mL = ◆ L	39.	0.746kL = ◆ L
40.	634mL = ◆ L	41.	3.254kL = ◆ L	42.	4.652 = ◆ mL	43.	5330mL = ◆ L
44.	0.459L = ◆ mL	45.	429mL = ◆ L	46.	0.202kL = ◆ L	47.	372L = ◆ kL

48. A large jug holds 1250mL of water. Convert this volume to litres.



49. A bottle contains 1.5L of juice. Convert this volume to millilitres.

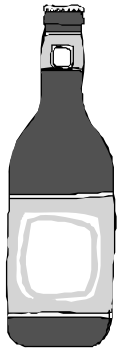
50. A cup will hold 250mL of milk. Convert this volume to litres.
51. A backyard swimming pool holds 25kL of water. Convert this volume to litres.
52. A water storage tank hold 15000L. Convert this volume to kilolitres.
53. A garden fish pool requires 0.85kL of water. Convert this volume to litres.
54. Twenty containers of milk hold 25000mL. Convert this volume to litres.



55. An oil tanker can hold 75kL. Convert this volume to litres.
56. A bottle of wine holds 0.75L. Convert this volume to millilitres.
57. A teaspoon of medicine is 5mL. Convert this volume to litres.

58. **Create** 10 conversion questions as above.
Exchange questions with a classmate and work out the conversions.

Calculations involving mixed capacity units:



Example: Andrew bought a 2.25L and a 450mL bottle of juice.
What is the total volume of juice that Andrew bought?

Is the answer as simple as adding 2.25 and 450 together?

To be able to add these two capacity (volume) measurements, the units must be the same.
One of the measurement values must be converted, so that both units are the same.

Example: We can answer in millilitres, ... 2.25L = 2250mL, therefore 2250 + 450 = 2700mL,
or we can answer in litres, ... 450mL = 0.45L, therefore 2.25 + 0.45 = 2.7L.

Answer: Andrew bought 2700mL or 2.7L of juice.

Task 6

Copy each question. **Answer** in the unit indicated in the brackets. **All** measurement units must be in the same unit before adding or subtracting.

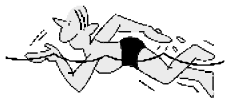
1.	3.27L + 1420mL = ◆ (mL)	2.	9.46kL – 5700L = ◆ (kL)	3.	9.25L + 8240mL = ◆ (L)
4.	8.52kL – 3640L = ◆ (L)	5.	1.59L + 4150mL = ◆ (L)	6.	3145L – 1.75kL = ◆ (kL)
7.	2.65L + 4620mL = ◆ (L)	8.	8095L – 4.75kL = ◆ (kL)	9.	4.75L + 7230mL = ◆ (mL)
10.	5942mL – 4.75L = ◆ (mL)	11.	6.56kL + 2449L = ◆ (L)	12.	7450mL – 5.29L = ◆ (L)
13.	509L + 7.25kL = ◆ (kL)	14.	7020mL – 5.65L = ◆ (mL)	15.	1.045kL + 955L = ◆ (kL)

Jodie has a collection of several differently shaped bottles.

16. If the capacity of seven bottles was 0.56L, 3.7L, 750mL, 2.5L, 1.2L, 350mL and 1000mL, calculate the total volume of these bottles. Answer in litres.

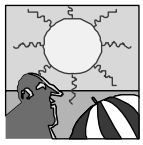
Laura made 7.5L of jam in a big pot on the stove.

17. How many 250mL jars could she fill from this 7.5L of jam?
18. If she sells the jam for $2.50 / jar, how much money would she make?



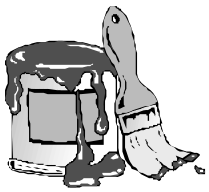
A local swimming pool holds 31500L of water.

19. Calculate the time taken to fill the pool if a water pump can pump water into the pool at a rate of 750L per hour.
20. If there is a water charge of $12.50 per 1000L, how much does it cost to fill the pool?



During a very hot week, water had to be added to the pool each day to replace the water lost because of evaporation.

21. If 2500mL, 3250mL, 1.2L, 2150mL, 0.95L, 850mL and 5400mL of water was added during this week, calculate the total volume of water added. Answer in litres.



Mr Moore is repainting his house in various colours.

22. If he buys six 500mL tins, three 10L pails and four 4L tins of paint, calculate the volume of paint he purchased. Answer in litres.
23. If the 500mL tins cost $15.50 each, the 10L pails cost $89.95 each and the 4L tins cost $64.95 each, calculate the total cost of buying this paint.

Mr Johnstone has been coughing for a long time. Each day he takes 7.5mL of medicine, 4 times a day.

24. Calculate the volume of medicine he would take in four weeks. Answer in litres.
25. For how many days will a 360mL bottle of medicine last?
26. For how many days will a 1.5 litre bottle of medicine last?
27. If 7.5mL of medicine costs $0.15, how much would a 0.6L bottle of medicine cost?

A fire-engine can pump water at a rate of 650L per minute.

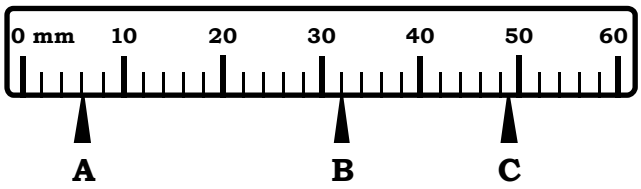
28. How much water was pumped from a swimming pool, if it took 27 min 30 sec to put out a fire using water from the pool?

29. **Make up** some similar word questions as above that you can exchange with a classmate.

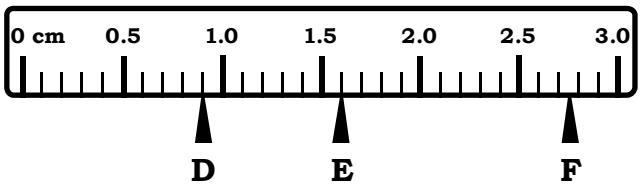
Reading scales:

When **reading a scale** it is important to note the **units** and what each **division** on the scale represents.
Example: Look at these rulers.

Ruler A



Ruler B



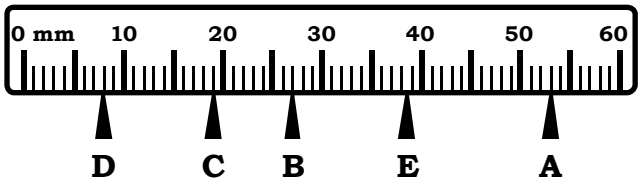
What are the units on the rulers? What does each division on these rulers represent?
List the readings indicated by the pointers.

Answers: Ruler A: units are millimetres, each division = 2mm. A = 6mm, B = 32mm, C = 49mm.
Ruler B: units are centimetres, each division = 0.1cm. D = 0.9cm, E = 1.6cm, F = 2.75cm.

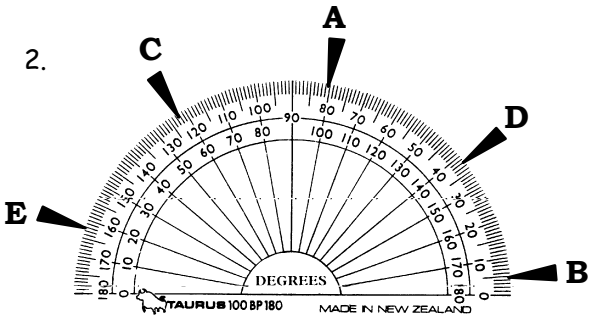
Task 7

Below are some diagrams of some measurement scales.
For each diagram ...
state the **unit** of measurement,
state what each **division** on the scale represents,
give the **measurements** indicated by the pointers.

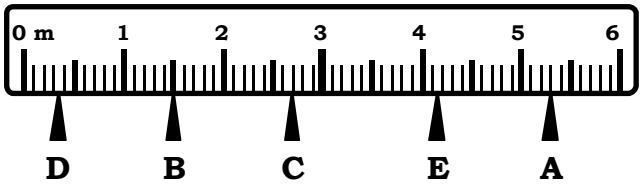
1.



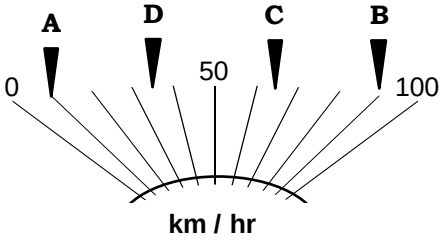
2.



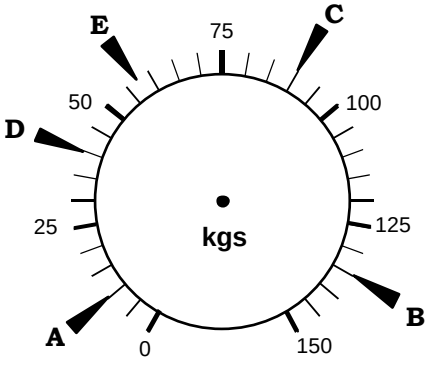
3.



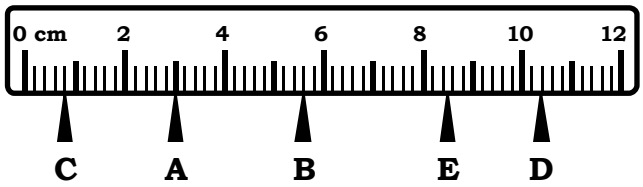
4.



5.



6.



7. **Mark** each point on the various scales as indicated, using the **'Marking Scales'** master.

M1

Measurement
Marking scales

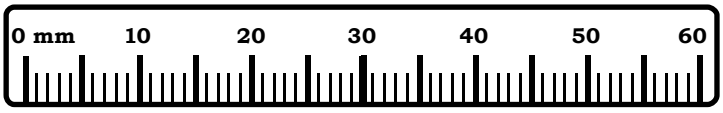
L5MM

Worksheet 7

Name: **Class:**

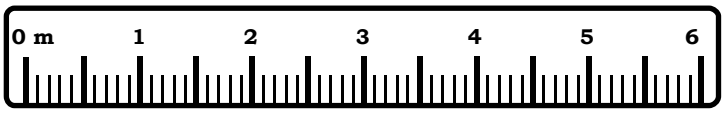
Use this sheet for Question 7, Task 7.

Ruler A

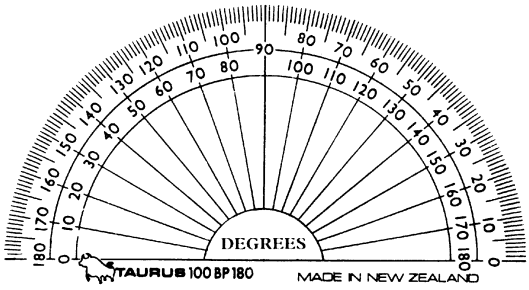


1. **Mark** these points on ruler A.
   A = 17mm, B = 24mm,
   C = 46mm, D = 3.2cm

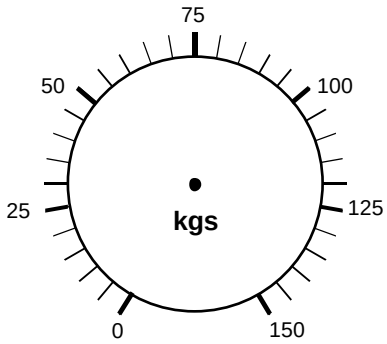
Ruler B



2. **Mark** these points on ruler B.
   A = 1.9m, B = 4.2m,
   C = 2.7m, D = 540cm

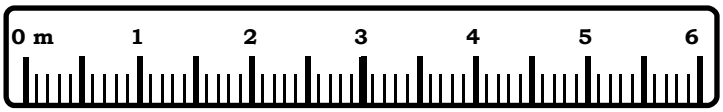


3. On this protractor, **mark** the following angles.
   A = 70°, B = 15°, C = 107°, D = 154°



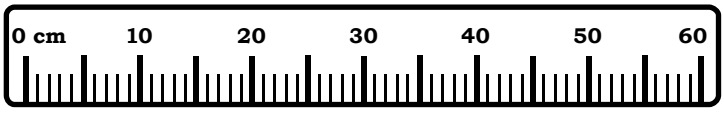
4. **Mark** these points on the dial above.
   A = 20kg, B = 60kg, C = 82.5kg, D = 147.5kg

Ruler C



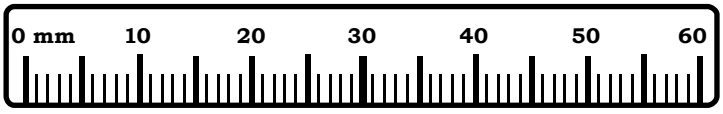
5. **Mark** these points on ruler C.
   A = 0.8m, B = 5.3m,
   C = 320cm, D = 4100mm

Ruler D



6. **Mark** these points on ruler D.
   A = 56cm, B = 21cm,
   C = 0.34m, D = 125mm

Ruler E

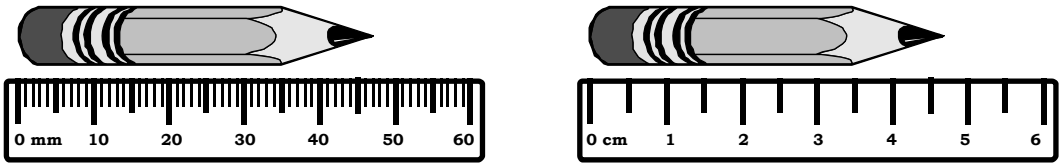


7. **Mark** these points on ruler E.
   A = 53mm, B = 37mm,
   C = 1.2cm, D = 0.029m

Accuracy of measurement:

The **degree of accuracy** of a measurement depends on the measuring device being used and the scale that is on the instrument, plus the ability of the user to read the scale accurately.

Example: Measure the length of this pencil using two different rulers.



How long is this pencil? Answer: About 47 millimetres and about $4\frac{1}{2}$ centimetres.

On the first ruler measuring millimetres, the length could be recorded as follows .... 47mm ± 1mm, where the symbol ± means 'plus or minus' and 1mm is the smallest division on the ruler.

From this, we can say that the pencil is no shorter than 46mm, but is no longer than 48mm.

On the ruler measuring centimetres, the length of the pencil is greater than 4.5cm, but less than 5cm. Because of the scale on the ruler, the measurement cannot be any more accurate than that.

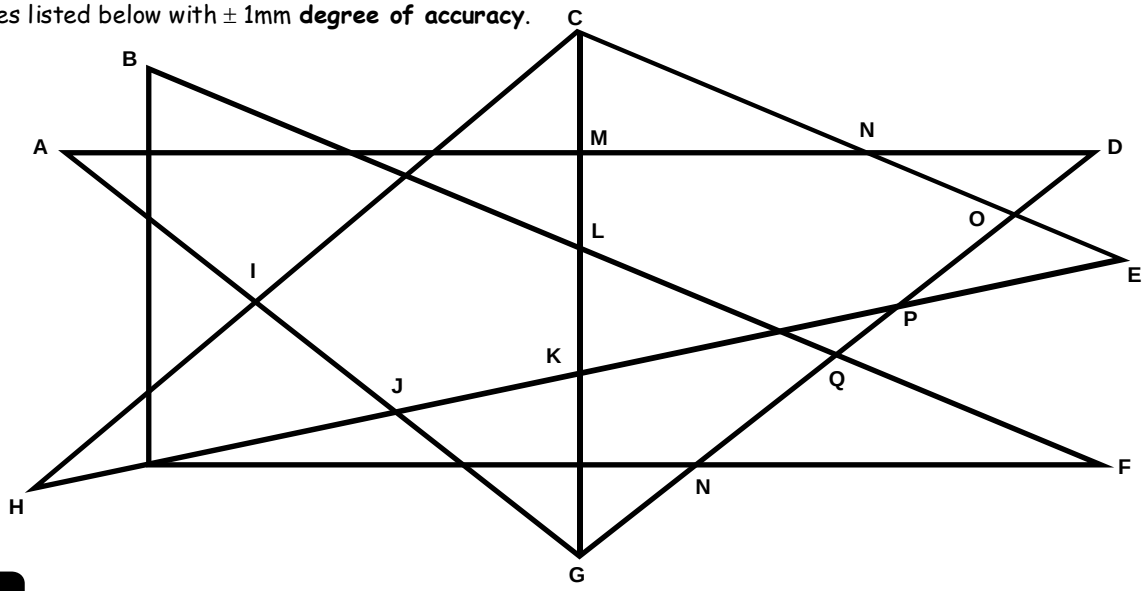
Task 8

State the **minimum** and **maximum** measurement for each measurement given below.

1.	37mm ± 1mm	2.	42cm ± 1cm	3.	1450m ± 1m	4.	236mm ± 3mm
5.	89mL ± 2mL	6.	77g ± 3g	7.	630km ± 2km	8.	31mg ± 4mg
9.	6.4m ± 0.1m	10.	8.6kg ± 0.2kg	11.	108.49m ± 0.05m	12.	8.95L ± 0.05L
13.	3.218m ± 0.005m	14.	2.048g ± 0.025g	15.	3.942L ± 0.150L	16.	1.342mg ± 0.250mg

Using millimetres as the unit of measurement, **measure** the distance between the points on these lines listed below with ± 1mm **degree of accuracy**.

17. points AD
18. points CG
19. points EH
20. points AJ
21. points CE
22. points FB
23. points LM
24. points DG
25. points HC
26. points PE
27. points JK

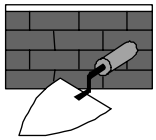


Task 9

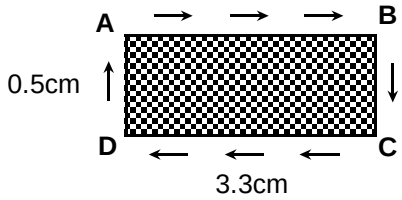
Use measurement devices, such as bathroom scales, kitchen scales and measuring jugs for this task. **Measure** up to 10 items with each device.

1. **Name** the measuring device and **state** the **degree of accuracy** it can measure.
2. Using each device, **measure** at **least 10 items**. **List** the items measured and the weights / capacities.
3. Have a classmate **measure** the same items and **compare** your results.

Finding the perimeter of a shape:



The distance around the outside (or inside) of a shape is known as its perimeter.
Example: Find the perimeter for this rectangle below.



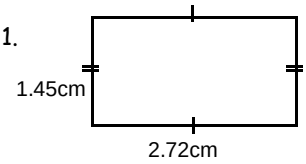
There are four sides ...
side AB = 3.3cm, side BC = 0.5cm,
side CD = 3.3cm, side DA = 0.5cm.

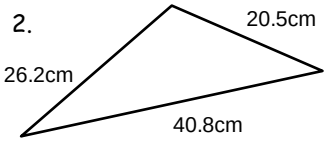
Add the length of the four sides to find the perimeter.
Answer: Perimeter = 7.6cm

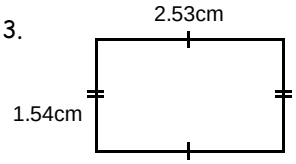
An easy way to remember perimeter is to imagine that you are walking around the outside of a shape, starting and stopping at the same point or corner, as shown by the arrows on the diagram above.

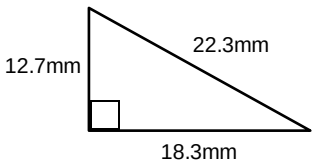
Task 10

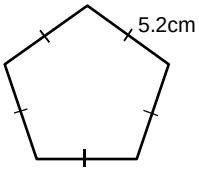
Calculate the perimeter of these shapes. Diagrams are not drawn to scale.

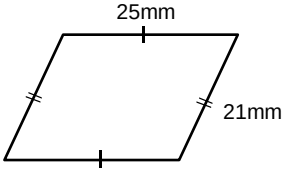
1.


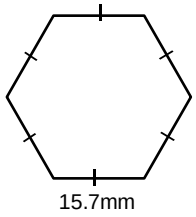
2.


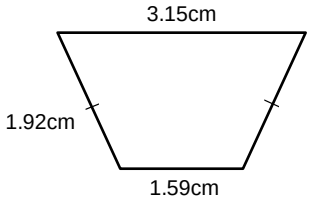
3.


4.


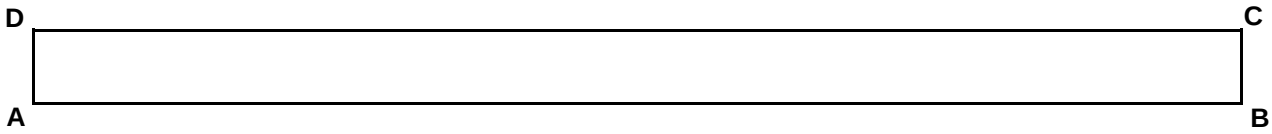
5.


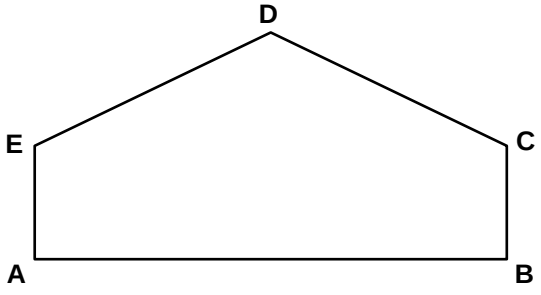
6.


7.


8.


Measure the length of the sides of these shapes below, to the nearest millimetre ± 0.5mm. *Example:* 27mm ± 0.5mm
State the **minimum** and **maximum** value for the length of each side. *Example:* 27 – 0.5 = 26.5mm, 27 + 0.5 = 27.5mm
Use this information to **calculate** the **minimum** and **maximum perimeter** of each shape.

9.


10.


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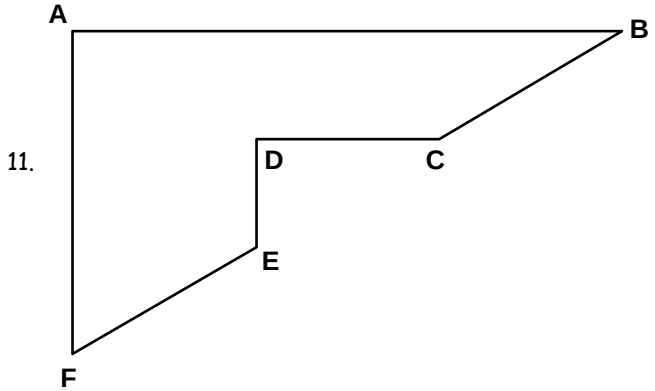


Task 11

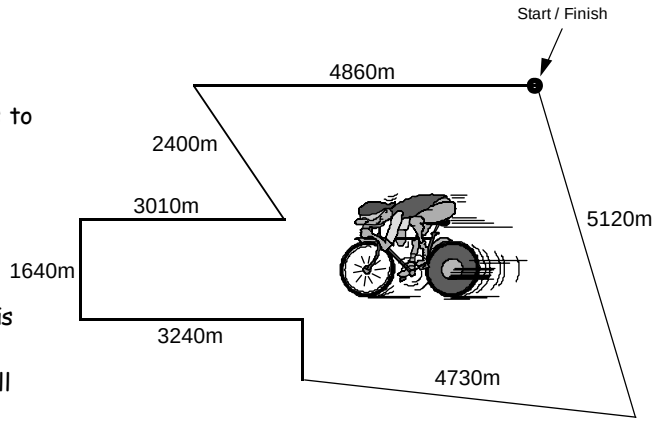
Look around your classroom or school playground for at least 10 items that you can find the perimeter of.
Example: a tennis court, your desk top, etc.

1. **List** the items, then **estimate** their perimeters.
2. Using rulers, tape measures or parts of your own body, such as your feet, **measure** the perimeter of your items.

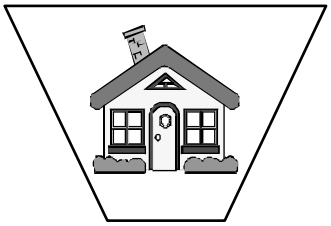
Word problems involving perimeter:

Task 12

This diagram shows the course for a road cycling race that is to be cycled around country roads.



1. How far is one lap of this course?
2. Convert this distance to kilometres.
3. If the B Grade riders race is 3 laps, how far is their race?
4. How many laps do the A Grade riders do if their race is 125km?
5. If Allan averages 36km / hr during a race, how long will he take to complete a 100km race?



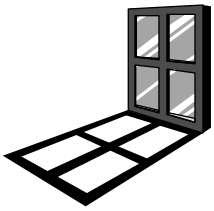
A new fence is to be built around a house on a section shaped like a trapezium. The section is 48.5m wide at the back, 37.6m along each side and 15.7m across the front.

6. Calculate the total length of the fence to be built, allowing 2.5m for a gate.
7. If the fence costs $17.50 per metre to build, calculate the cost of building this fence.

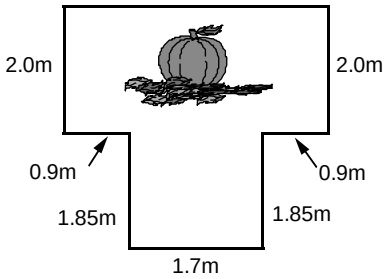
A 25 metre fence is to be built around a swimming pool.

8. If the shape around the pool is square, how long is each side?

Pam is going to sew fancy tape down the sides and across the bottom of some curtains she has already made. Each window has one curtain, made from lengths of material that are twice the width of the window. The windows are 1.85m, 0.9m and 2.25m wide and ALL windows are 1.65m high.



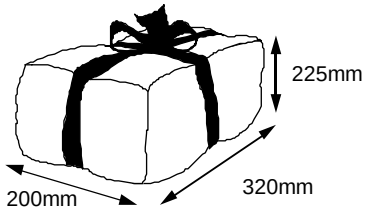
9. Calculate the length of curtain material needed for each window.
10. If curtain material is $11.95 / metre, calculate the total cost of the material needed.
11. Calculate the length of tape required for each window.
12. If the tape costs $0.45 per metre, calculate the total cost of the tape needed.



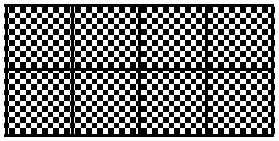
Mr McGregor is going to protect his vegetables by putting up shade cloth around his vegetable garden, as shown in this diagram.

13. Calculate the perimeter of his vegetable garden.
14. If Mr McGregor paid $318.99 for the shade cloth, calculate the cost per metre of the shade cloth.

Alex is going to tie a ribbon around this parcel. The dimensions of the parcel are shown in the diagram.



15. Calculate the length of ribbon that is needed to go around the parcel, then add 650mm to allow for a bow to be tied.
16. If the ribbon costs $0.35 per metre, calculate the cost of the ribbon.



These 8 shaded squares have been arranged as shown in the diagram. Each square has sides that are 2.5cm long.

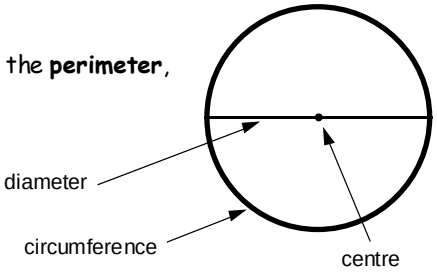
17. What is the perimeter of this shaded shape?
18. Rearrange the 8 shaded squares to form a shape that has a perimeter of 35 centimetres. Draw a diagram to show your arrangement.
19. How would you rearrange these squares to form a shape with the maximum perimeter? Draw a diagram to show your arrangement.

20. **Create** word problems involving perimeter as above.
Exchange questions with a classmate and compare your answers.

Finding the circumference of a circle:

The distance around the outside of a shape with straight or curved sides is called the **perimeter**, but for a circle the same measurement is called the **circumference**.

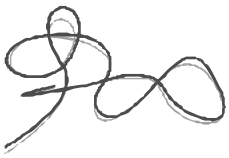
A line across a circle, from one side to the other passing through the **centre** is called the **diameter**.



Task 13

How is the circumference of a circle and the diameter of a circle related?

1. Conduct this experiment to find out, using a cylinder (can of baked beans), some string and a ruler.



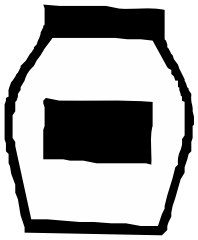
Step 1: **Wrap** some string around the circular part of the can once, **marking** the string where its joins.

Step 2: Unwrap the string and stretch it out straight.

Step 3: **Measure** the length of the string between the marks. This represents the circumference of a circle. *Example:* 21.5cm

Step 4: **Measure** the distance across the centre of the circular end, passing through the centre. This represents the diameter of the circle. *Example:* 7cm

Step 5: **Divide** the circumference measurement by the diameter measurement. *Example:* 21.5 ÷ 7 = 3.07cm



2. **Create** a table with the following headings ...

Object	Circumference (C) mm	Diameter (d) mm	C ÷ d
For example: 10c coin	71mm	23mm	3.09mm

Locate up to 10 circular objects within your classroom or use the objects supplied by your teacher.

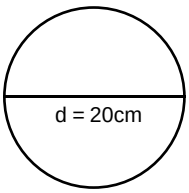
Work out the circumference and **measure** the diameter of your objects, following the steps above.

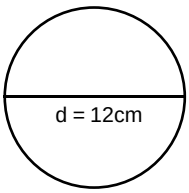
Enter your measurements in the table and **calculate** C ÷ d.

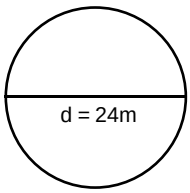
3. **Write** a **rule** for the relationship between the circumference of a circle and its diameter.

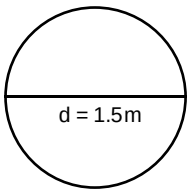
Example: **Circumference = ♦ × diameter**

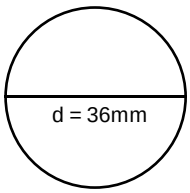
Use your **rule** to find the circumferences of these circles, given the diameters.

4. 

5. 

6. 

7. 

8. 

The circumference of a circle can be worked out using the formulae ...
where r = *radius*, d = *diameter* and π = *pi* = 3.14 (2 d.p.)

C = 2πr or **C = πd**

Use these formulae to work out the circumferences of these circles rounded to 2 d.p. where ...

9. r = 8cm 10. d = 50cm 11. r = 2.4mm 12. d = 3.6km 13. r = 0.6m 14. d = 45.8mm

'If you can paint it, it has area':

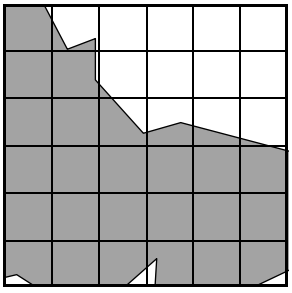
The amount of surface a shape takes up is called its **area**.

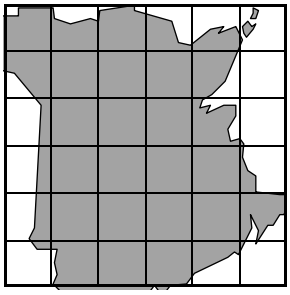
Example: A painter covered the floor with 10 square sheets of newspaper to protect the carpet while he was painting. The area of the floor could be described as 10 square sheets.

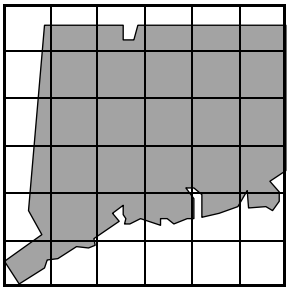
In the metric system, the most commonly used area units are **square millimetres**, **square centimetres**, **square kilometres** or **hectares**. A hectare is a 100m × 100m = 10000 square metres. These area units can be written as abbreviations ... **mm²**, **cm²**, **m²** and **h**.

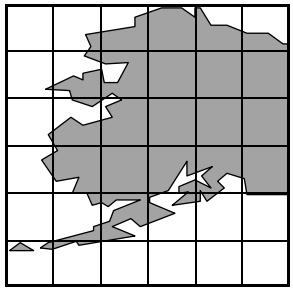
Task 14

Estimate the area of the shaded shapes by counting whole and part squares.

1. 

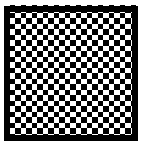
2. 

3. 

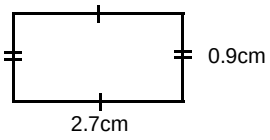
4. 

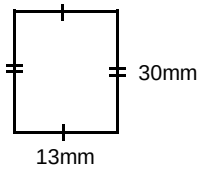
5. **Copy** and **complete** the following **rule** for calculating the area of squares and rectangles.

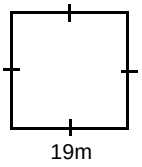
Area = ... × ....

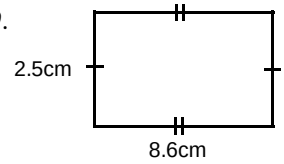


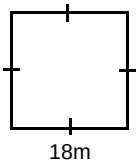
Use your area rule to calculate the area of these shapes below.
Remember to include the name of the unit in your answers.

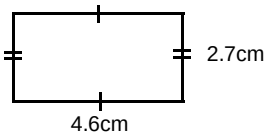
6. 

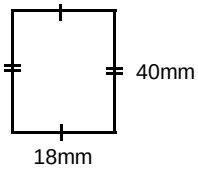
7. 

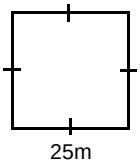
8. 

9. 

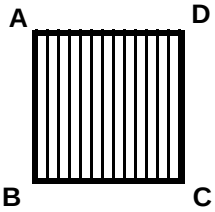
10. 

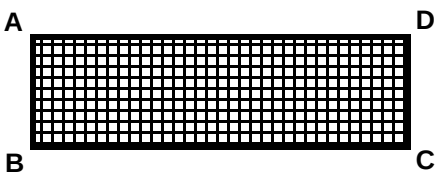
11. 

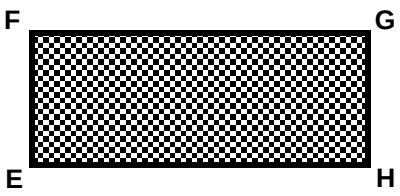
12. 

13. 

Measure the length of the base and height for each shape, then **calculate** its area, in mm².

14. 

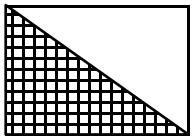
15. 

16. 

17. If the area of a rectangle is 56cm² and one side is 7cm, how long is the other side?
18. If the area of a rectangle is 96m² and one side is 12m, how long is the other side?
19. If the area of a square is 121mm², what is the length of each side?
20. If the area of a square is 225cm², what is the length of each side?

Finding the area of a triangle:

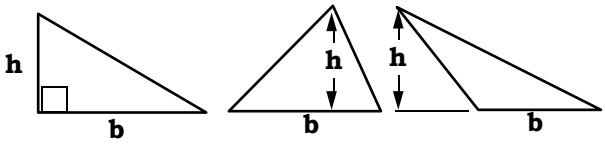
If the area of a **Square or Rectangle = Base × Height**, how do you calculate the area of a triangle?



A triangle is half the size of a square or rectangle with the same base and height, therefore the area of a triangle is half that of the square or rectangle.

To find the area of a triangle use ...

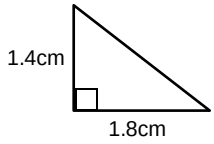
Area of Triangle = ½bh

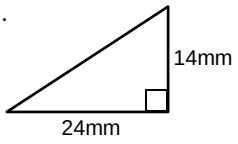


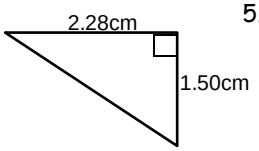
Task 15

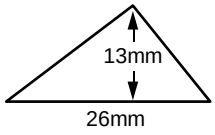
1. What is the size of the angle between the base and height of a square, rectangle or triangle?

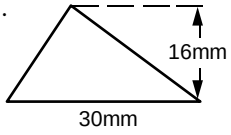
Calculate the area of each triangle using the formula **A = ½bh**.

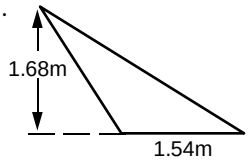
2. 

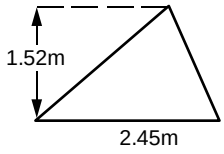
3. 

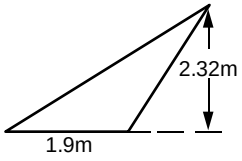
4. 

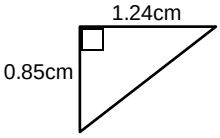
5. 

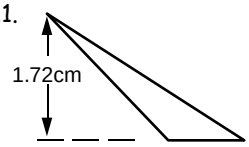
6. 

7. 

8. 

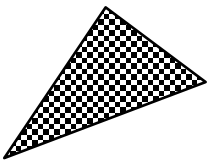
9. 

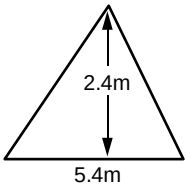
10. 

11. 

Find the lengths of the missing sides, given the areas and one side for each triangles.

12. If the area of a triangle is 48cm^2 and base is 8cm, what is the height of the triangle?
13. If the area of a triangle is 63cm^2 and height is 12cm, what is the base of the triangle?
14. If the area of a triangle is 108cm^2 and base is 9cm, what is the height of the triangle?
15. If the area of a triangle is 8.64cm^2 and height is 2.4cm, what is the base of the triangle?





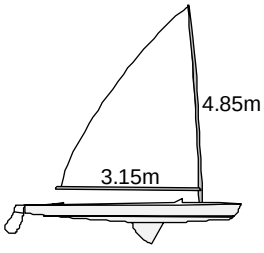
A triangular section of a wall, as shown in the diagram, is to be painted with three coats of paint.

16. Calculate the total area to be painted.
17. If 1 litre of paint covers 15m^2, what volume of paint will be needed to paint this area?

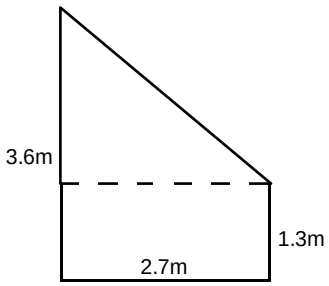
A second triangular section of wall has an area of 5.58m^2 and a base of 6.2m.

18. Calculate the height of this section of wall.

This diagram shows the dimensions of a triangular sail for a yacht.

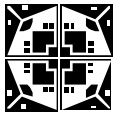


19. Calculate the area of sail cloth needed to replace the sail.
20. Sail cloth costs $264.50 per square metre. To make the sail costs $450. Calculate the cost of replacing the sail.



A section of floor, as shown in the diagram, is to be tiled.

21. Calculate the total area to be tiled.
22. If 9 tiles are required per square metre of floor, calculate the number of tiles needed to cover this area.
23. If tiles cost $2.65 each, plus a labour charge of $150, calculate the cost of tiling this floor.
24. If a 10% discount is offered for cash, what price would you pay?

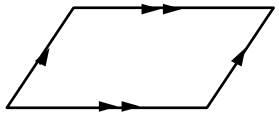


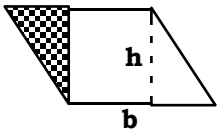
25. **Make up** some similar word questions as above that you can exchange with a classmate.

Finding the area of a parallelogram:

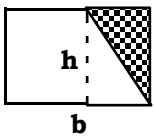
A parallelogram has two pairs of parallel sides.

How can you turn a parallelogram into a square or rectangle?





Cut a triangular shape off one end and move it to the other end to form a square or rectangle, therefore, $A = bh$.

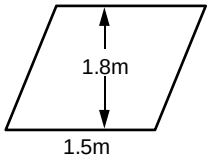


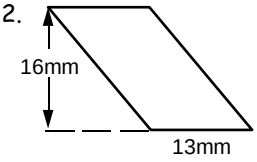
To find the area of a parallelogram use ...

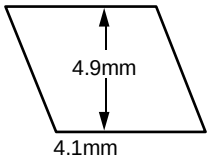
Area of Parallelogram = bh

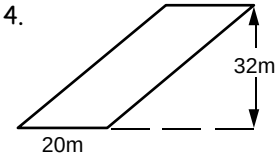
Task 16

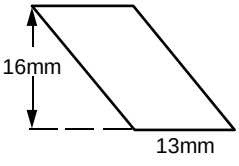
Calculate the area of each parallelogram.

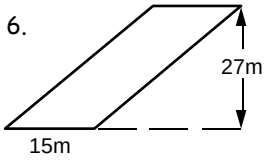
1. 

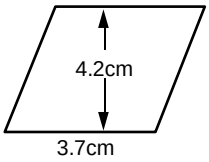
2. 

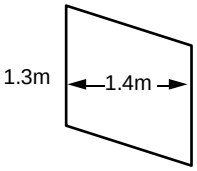
3. 

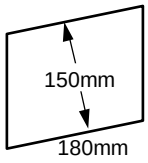
4. 

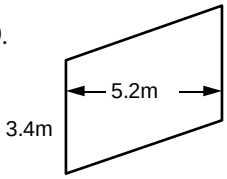
5. 

6. 

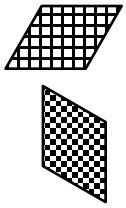
7. 

8. 

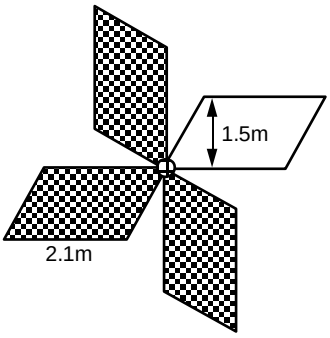
9. 

10. 

Find the lengths of the missing sides, given the areas and one side for each parallelogram.



11. If the area of a parallelogram is 13.5cm^2 and base is 1.5cm, what is the height of the parallelogram?
12. If the area of a parallelogram is 19.2mm^2 and height is 2.4mm, what is the base of the parallelogram?
13. If the area of a parallelogram is 14.4cm^2 and base is 3.6cm, what is the height of the parallelogram?
14. If the area of a parallelogram is 5.85cm^2 and height is 1.3cm, what is the base of the parallelogram?



Part of a floor design for a shopping centre is made up of four parallelograms, as shown in the diagram. All parallelograms are the same size.

15. Calculate the area of one parallelogram.
16. What is the total area of these parallelograms?

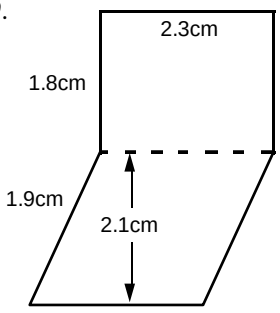
The area is to be tiled with floor tiles that require 50 tiles per square metre.

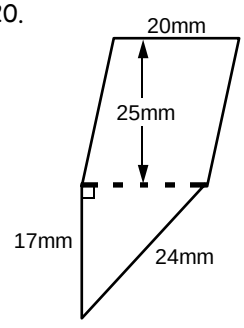
17. Calculate the number of tiles needed to tile the four parallelograms.

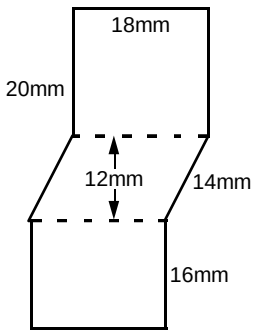
The tiles cost $76.50 per square metre to buy and there is a labour charge of $250 to lay the tiles.

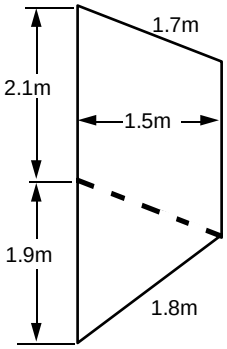
18. Calculate the cost of having this floor area tiled.

Choose the correct measurements needed to calculate the areas of these compound shapes.

19. 

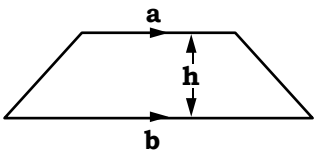
20. 

21. 

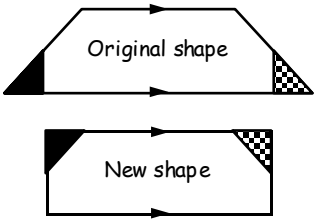
22. 

Finding the area of a trapezium:

A trapezium has one pair of parallel sides, labelled a & b.



How can you turn a trapezium into a square or rectangle?

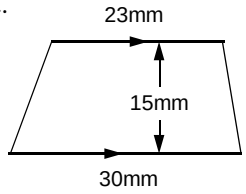


Cut a triangular shape off each end and move it to the position shown on the diagram.
This would make side 'a' longer and side 'b' shorter.
The parallel sides are now the same length. Side length is worked out using $\frac{1}{2}(a+b)$.
The perpendicular distance 'h' between the parallel sides is still the same.

To find the area of a trapezium use ... **Area of Trapezium = ½(a + b)h**

Task 17

Calculate the area of each trapezium.

1.


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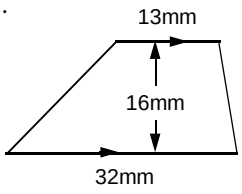

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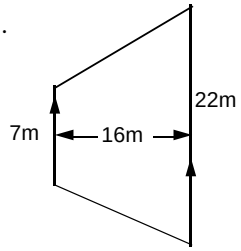

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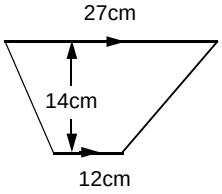
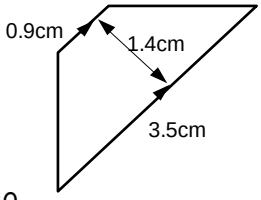


5.


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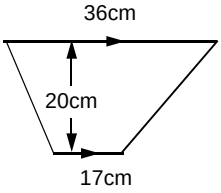
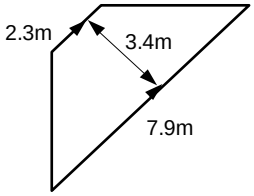
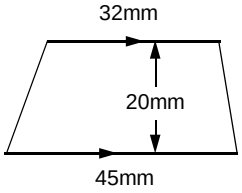


7.


8.


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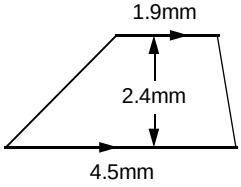

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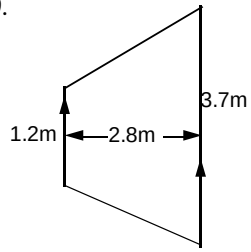
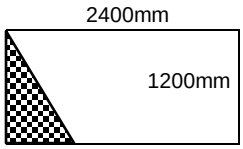


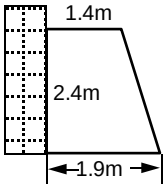


A sheet of flooring particle board measures 2400mm by 1200mm. A triangular corner that measures 1200mm by 720mm has been cut off the sheet, as shown in the diagram.

11. Calculate the area of the sheet that is left.

This diagram shows the cross-section of a glasshouse that has been built against the side of a building (shaded area). Due to storm damage the glass in this end has to be replaced at a cost of $85.50 /m^2.

12. Calculate the area of glass needed and the cost to do this job.



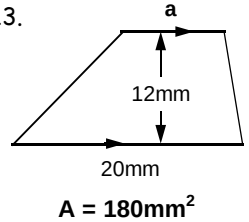
If the area of a trapezium is given, the formula for the area of a trapezium **A = ½(a + b)h** can be rearranged so that the length of a missing side or the distance between the parallel sides can be found.

Example:

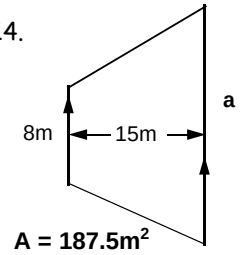
To find the length of a missing side use ... $a = \frac{2A}{h} - b$

To find the distance between the paralell sides use ... $h = \frac{2A}{a+b}$

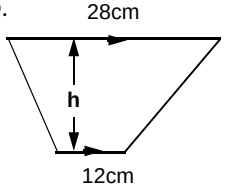
Use either rearranged formula above to find the missing measurements on these diagrams.

13.


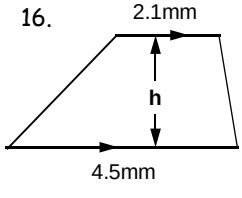
A = 180mm^2

14.


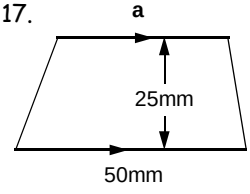
A = 187.5m^2

15.


A = 300cm^2

16.


A = 11.88 mm^2

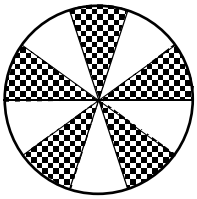
17.


A = 1125mm^2

Finding the area of a circle:

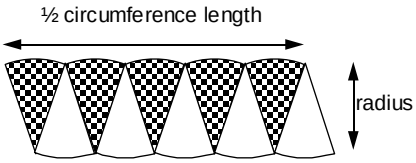
A circle has been divided into 10 sectors, with half the sectors shaded.

Example:



The sectors were then cut out and arranged with half facing up and half facing down.

What shape has almost been created and how do you work out the area of this shape?



The shape created is called a parallelogram. Area of a parallelogram = Base × Height = **bh**.

On the diagram ... **'base'** = ½ circumference = **½(2πr)** = **πr** and **'height'** = radius = **r**

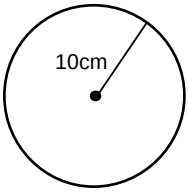
From this we can create the formula for finding the area of a circle ...

Area of Circle = πr^2

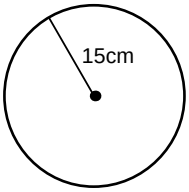
Task 18

Calculate the area of each circle, using $\pi = 3.14$. Round all answers in **Task 18** to 2 d.p.

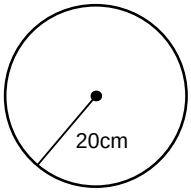
1.



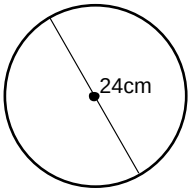
2.



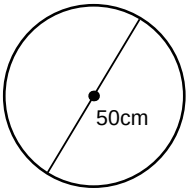
3.



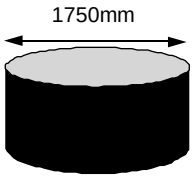
4.



5.



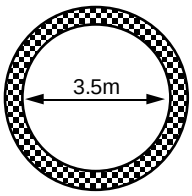
A new circular outdoor spa pool has been built in the backyard of Linda's house and requires a cover to help keep the water warm. The dimensions are shown in the diagram.



6. Work out the radius of the cover and convert this measurement to metres.
7. Calculate the area of the cover, giving your answer in square metres (use $\pi = 3.14$).

The cost of spa pool material is $165.60 per square metre, plus a $150 making charge.

8. Calculate the cost of making the spa pool cover.



The diagram shows a bird's eye view of a circular swimming pool. The diameter of the pool is 3.5m. The shaded region is an area around the pool that is to be tiled and it is 25cm wide.

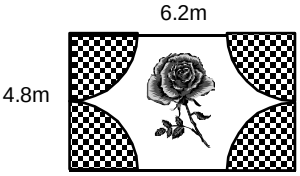
9. Work out the radius of the pool and calculate the surface area of the pool (use $\pi = 3.14$).
10. What is the radius of the pool and tiled area combined?
11. Calculate the area that is to be tiled (use $\pi = 3.14$).

It costs $84.20 / square metre to tile this area, plus a $200 labour charge.

12. Calculate the cost of tiling this area.

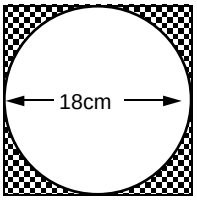
This diagram shows a backyard in which there are four rose gardens, one in each corner.

13. Calculate the total area of rose gardens (use $\pi = 3.14$).

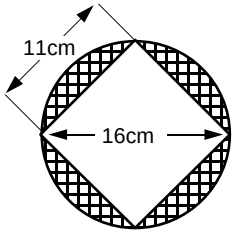


Calculate the areas of these compound shapes or the area of the shaded region in each of these diagrams. Use $\pi = 3.14$ and round your answers to 2 d.p.

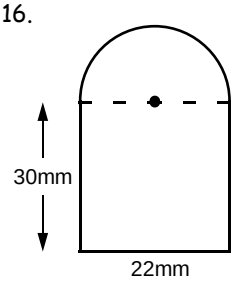
14.



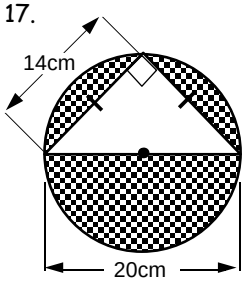
15.



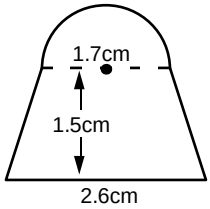
16.



17.



18.



'If you can fill it, it has volume':

Example: Chris used a 250mL cup to fill a bottle with water. If the bottle required 7 cups to fill it, what is the volume of the bottle? Answer: 7 × 250mL = 1750mL or 1.75L

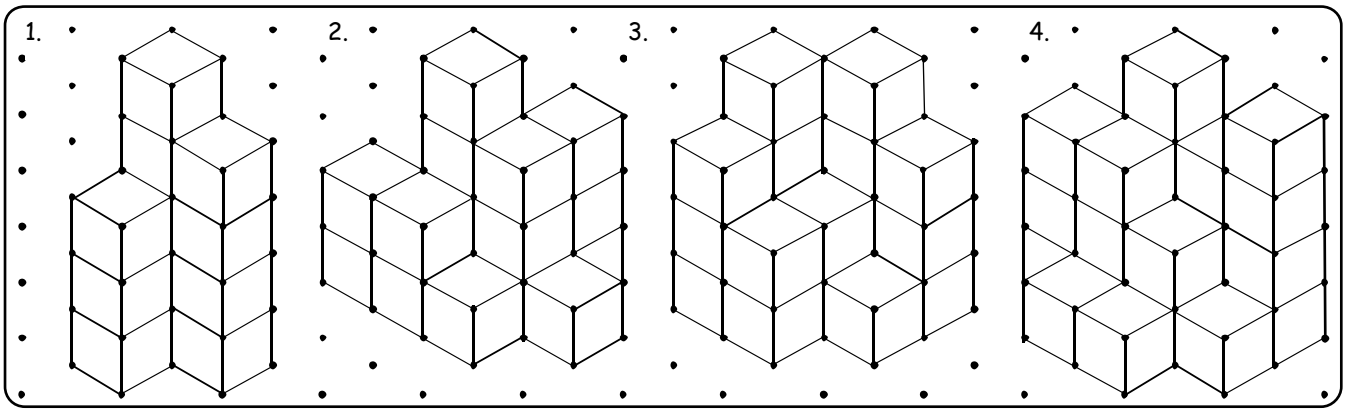
The **volume** or **capacity** of an object is the **amount of liquid** (or air) **it holds**.

Example: Keith likes building with bricks that are the shape of cubes. If he neatly stacks 50 cubes in a pile, what is the volume of the stack?
Answer: As we do not know the size of the cubes, we can say the volume of this pile is 50 cubes.

The volume or capacity of a 3D shape is the **amount of space it takes up**.

Task 19

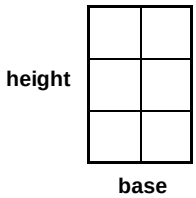
Work out the volume of each pile of cubes. Remember to include cubes you cannot see.



Draw shapes on some isometric paper that have the following volumes ...

5. 8 cubes 6. 14 cubes 7. 20 cubes 8. 30 cubes

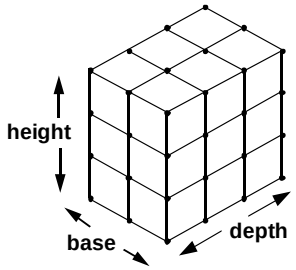
John stacked a pile of cubes. The diagram below shows the **'end'** view of the cubes.



9. **Calculate** the area of the **'end'** 2D shape, using the rule ...

Area = base × height

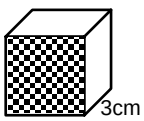
The **'end' view** for a 3D object is also known as the **cross-section** of the 3D object.



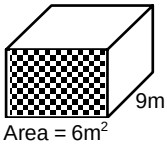
If you know the area of the **cross-section** of a 3D object, the volume can be calculated using the rule ...

Volume = Area of cross-section × depth

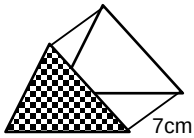
Calculate the volume of these objects, given the area of the cross section and the depth. The volume units are written as ... **mm³**, **cm³** and **m³**.

10. 

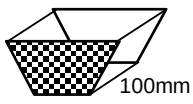
Area = 9cm²

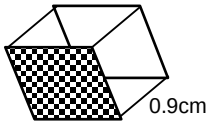
11. 

Area = 6m²

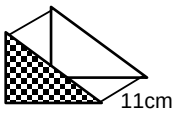
12. 

Area = 5cm²

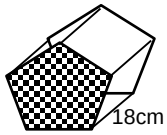
13. Area = 300mm²


14. 

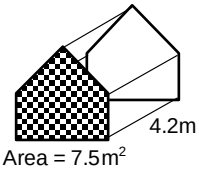
Area = 1.5cm²

15. 

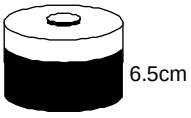
Area = 24cm²

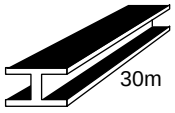
16. 

Area = 50cm²

17. 

Area = 7.5m²

18. Area = 4cm²


19. 

Area = 0.5m²

M1

Measurement

L5MM

Worksheet 17

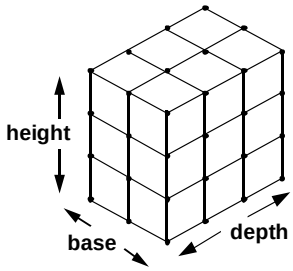
Isometric paper Master Sheet

Name: **Class:**

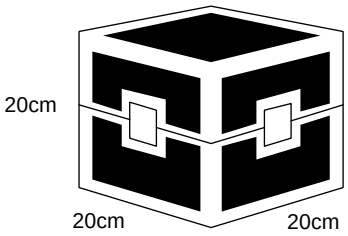
Finding the volume of a cube or similar shape:

Following on from **Task 19**, the volume of an object can be found using the following rule ...

Volume = base × height × depth



Example: **Calculate** the volume of this box.

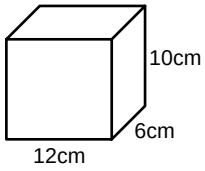


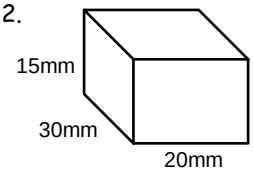
Volume = 20 × 20 × 20 = 8000cm^3

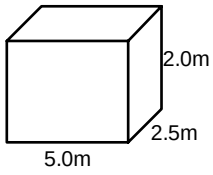
In the metric system, the most common units of volume are cubic millimetres, cubic centimetres and cubic metres. These volume units can be written as abbreviations ... **mm^3**, **cm^3** and **m^3**.

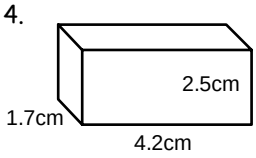
Task 20

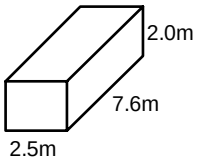
Calculate the volume of these objects.

1.


2.


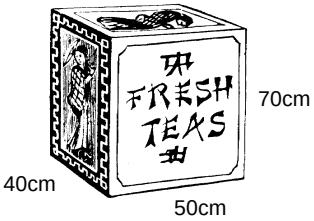
3.


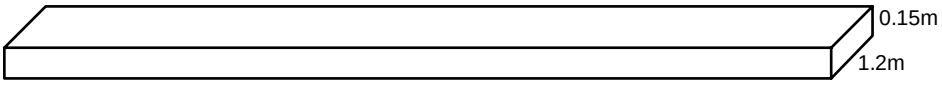
4.


5.


In the olden days, tea was shipped around the world in wooden boxes called tea chests.

6. Calculate the volume of this tea chest. Answer in m^3.
7. If measurements for base, width and height of the tea chest were all doubled, what would the new volume of the tea chest be?



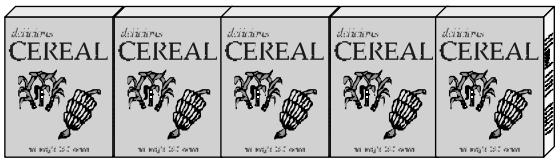


Mr Brown is making a new concrete path that is 75 metres long, 1.2 metres wide and 0.15 metres deep.

8. Calculate the volume of concrete he will need for this path.
9. If concrete costs $56.50 per cubic metre, calculate the cost of concreting this path.

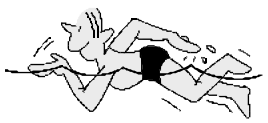
A cereal box is 30cm high, 15cm wide and 7cm deep.

10. Calculate the volume of one cereal box.

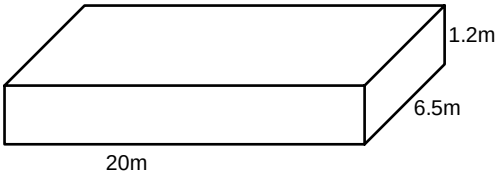


Five cereal boxes were placed end on in a line, as shown in the diagram.

11. State the dimensions of the line of boxes and calculate total volume.



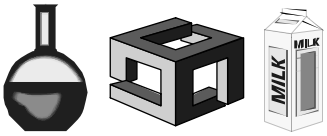
The dimensions of a swimming pool are shown in the diagram.
The swimming pool is to be filled with water, 10 centimetres from the top.



12. Calculate the volume of water needed to fill the pool.
13. What is the water level in the pool if it contains 65m^3 of water?
14. What is the water level when the pool is 75% full?
15. If the pool fills at a rate of 35m^3 of water per hour, how long will it take to fill the pool with water, rounded to the nearest minute?

16. **Make up** some similar word questions as above that you can exchange with a classmate.

More volume problems involving various prisms:



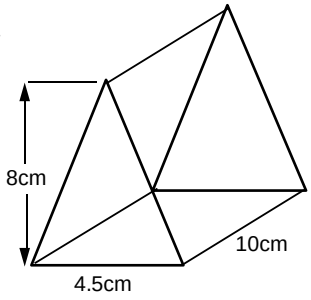
Remember, the volume of prism can be worked out by using the rule ...

Volume = Area of cross-section × depth

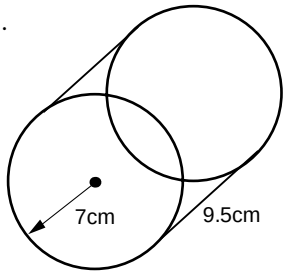
Task 21

Calculate the volume of these 3D objects. Use $\pi = 3.14$ for all questions involving circles.
Round all your answers in Task 21 to 2 d.p.

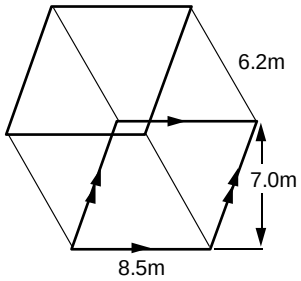
1.



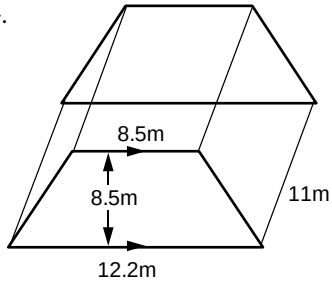
2.

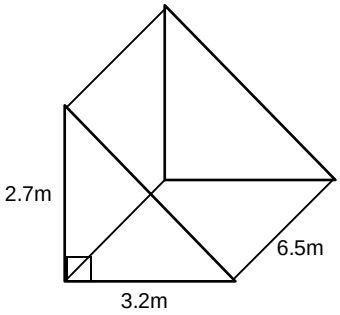


3.



4.





A triangular shaped glasshouse has the dimensions as shown in the diagram.

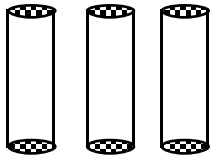
5. Calculate the volume of air within the glasshouse.

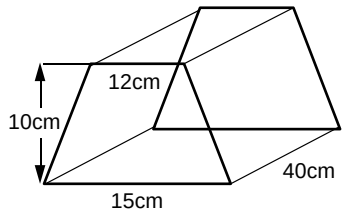
On very hot days a fan is used to blow hot air out one end of the glasshouse, which is replaced with cooler air from outside.

6. If the fan can move air at a rate of $15m^3$ per minute, how long would it take to replace the hot air with cooler air?

Six concrete columns the shape of cylinders are to be constructed to support the roof of a building. Each column is 3.5 metres tall, with a radius of 30cm

7. Calculate the volume of concrete needed to create one column (use $\pi = 3.14$).
8. If concrete costs $95.00 / cubic metre, calculate the total cost for the concrete needed to construct all columns.





This diagram shows the size and shape of aluminium cans compressed down for recylcing.

9. Calculate the volume of this compressed block of aluminium cans.
10. If one compressed block of aluminium cans weighs 7.5kg, how many blocks need to be compressed before you have 1 tonne of aluminium?

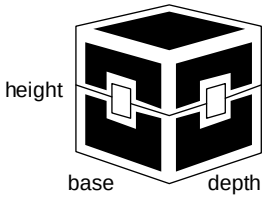
11. A rectangular prism has a volume of $576cm^3$. If the base is 8cm and the height is 12cm, what is the depth of the rectangular prism?

12. A rectangular prism has a volume of $146.25m^3$. If the depth is 9m and the height is 2.5m, what is the base of the rectangular prism?

13. A rectangular prism has a volume of $35.49cm^3$. If the depth is 7cm and the base is 3.9cm, what is the height of the rectangular prism?

14. A triangular prism has a volume of $840cm^3$. If the depth is 20cm and the base is 7cm, what is the height of the triangular prism?

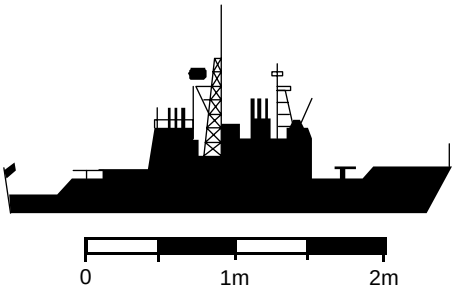
15. A triangular prism has a volume of $26.95m^3$. If the depth is 5.0m and the height is 2.2m, what is the base of the triangular prism?



16. **Make up** some similar word questions as above that you can exchange with a classmate.

Understanding and using scale diagrams:

This **scale** diagram of a model battleship has been drawn using the scale below the diagram.



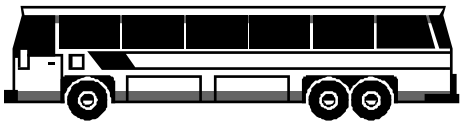
For this scale, 1cm on paper represents an actual length of 0.5m.
If the diagram is 6cm long, what is the actual length of the model battleship? Answer: 3 metres

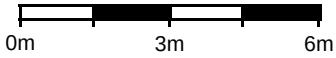
Similar scales are used for maps and plans, such as house plans.

Task 22

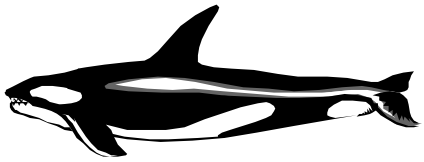
For each scale diagram, **use** the **scale** that has been given to calculate the actual length.

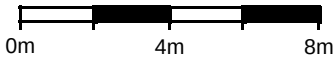
1. **Measure** the length of the bus in this diagram.
2. **Use** the **scale** below to work out the actual length.



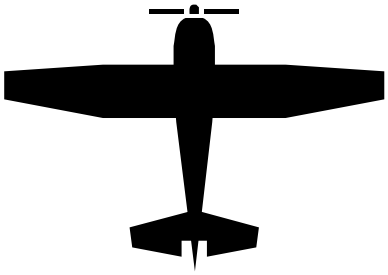


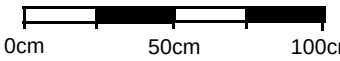
3. **Measure** the length of the killer whale in this diagram.
4. **Use** the **scale** to work out the actual length.





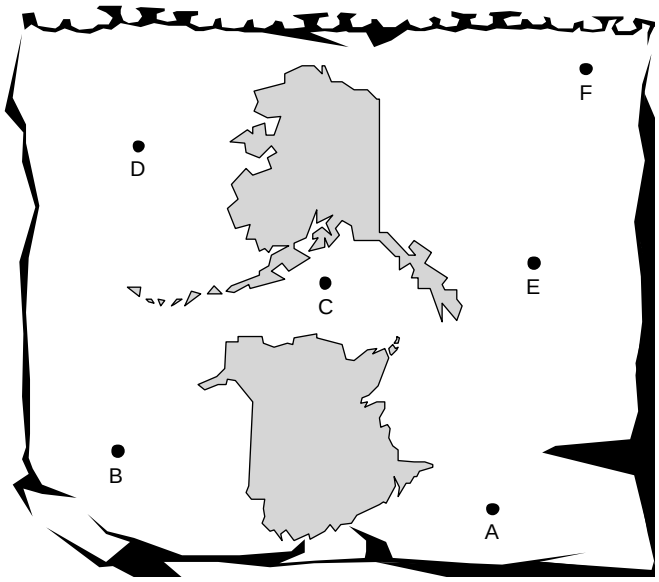
5. **Measure** the wing span of a model plane in this diagram.
6. **Use** the **scale** to work out the actual length.

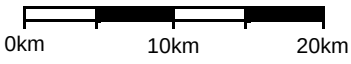




7. **Measure** various objects in the classroom. Using an appropriate scale, draw scale diagrams of your objects.

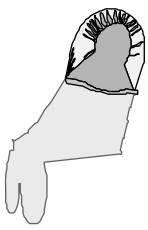
This old map has been drawn using the scale below. The dots / letters represent towns.





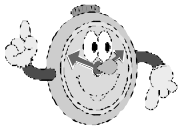
Measure, to the nearest millimetre, the shortest distances between these towns. **Convert** your measurements to actual distances using the scale above ...

8. Town A and Town C.
9. Town B and Town F.
10. Town A and Town D.
11. Town C and Town E.
12. Town D and Town F.
13. Town B and Town E.
14. Town A and Town F.
15. Town D and Town B.



16. **Create** your own map, with a suitable scale. Exchange your map with a classmate and have her / him **work out** the **distances** between various points on your map.

Understanding time units / Analogue & digital time:



Being able to tell the time and convert between time units is an important skill.

Example: Is 5:17 p.m. in the morning or afternoon?
Are there 210 seconds in $3\frac{1}{2}$ minutes?
If a TV programme starts at 1:25 p.m. and runs for 80 minutes, when will it end?

Answers: p.m. is in the afternoon, 210 seconds = $3\frac{1}{2}$ minutes and the programme would end at 2:45 p.m.

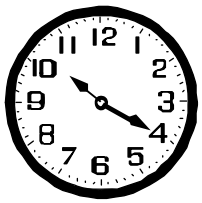
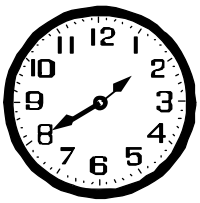
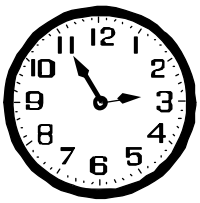
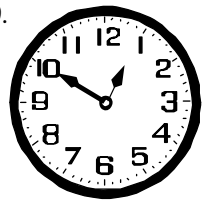
Discuss how you think we would get on if there was no way of telling the time.

Task 23

Time yourself as you answer these questions involving **basic time units** and replace the ◆ as you **convert between time units**.

1. How many seconds in 5 minutes?
2. How many minutes in $6\frac{1}{4}$ hours?
3. How many hours in $4\frac{3}{4}$ days?
4. How many days in 11 weeks?
5. How many weeks in $\frac{1}{2}$ a year?
6. How many days in a leap year?
7. 435 seconds = ◆ minutes
8. $6\frac{3}{4}$ minutes = ◆ seconds
9. 165 minutes = ◆ hours
10. 260 minutes = ◆ hours
11. 54 hours = ◆ days
12. 90 hours = ◆ days
13. $45\frac{1}{2}$ days = ◆ weeks
14. $11\frac{1}{2}$ weeks = ◆ days
15. How long did it take you to answer the above questions?

A clock with hands shows **analogue time**. When telling the time from an analogue clock we use expressions such as, *20 past 3* or *¼ to 4*. What would you say, as you read the time on these clocks?

16. 
17. 
18. 
19. 
20. 

Draw clock faces to show these **analogue times**.

21. $\frac{1}{4}$ past 8
22. 5 to 5
23. 10 past 12
24. 20 to 1
25. 20 past 9

Some clocks do not have hands, but display the time as numbers. This is known as **digital time**.

Example: **03:25** means 25 past 3 **04:50** means 10 to 5

26. **Write** the **analogue times** in questions 16 to 25 above as the time would appear on **digital clocks**.

Add and **subtract** these mixed time units. Give your answer in the time unit in the brackets.

27. 45 sec + 4 min = ◆ (sec)
28. 110 sec – $1\frac{1}{4}$ min = ◆ (sec)
29. 150 sec + 5 min = ◆ (min)
30. 4 min – 75 sec = ◆ (min)
31. 210 min + 4 hrs = ◆ (min)
32. 5 hrs – 255 min = ◆ (hrs)
33. $3\frac{1}{2}$ hrs + 270 min = ◆ (hrs)
34. 450 min – $2\frac{1}{4}$ hrs = ◆ (min)
35. 2 days + 15 hrs = ◆ (hrs)
36. 54 hrs – $1\frac{1}{2}$ days = ◆ (hrs)
37. 42 hrs + $4\frac{1}{2}$ days = ◆ (days)
38. 5 days – 60 hrs = ◆ (days)
39. $2\frac{1}{2}$ wks + 14 days = ◆ (wks)
40. 63 days – $3\frac{1}{2}$ wks = ◆ (days)
41. $24\frac{1}{2}$ days + 5 wks = ◆ (wks)
42. $3\frac{3}{4}$ hrs + 255 min = ◆ (hrs)
43. $3\frac{1}{2}$ hrs + 315 min = ◆ (hrs)
44. $4\frac{1}{2}$ hrs – 240 min = ◆ (hrs)
45. 540 min – $2\frac{1}{4}$ hrs = ◆ (min)
46. 76 min – $1\frac{3}{4}$ hrs = ◆ (min)
47. $2\frac{1}{4}$ days + 15 hrs = ◆ (hrs)

Converting between a.m. / p.m. and 24hr time:

To avoid confusion between time in the morning (a.m.) and time in the afternoon (p.m.), time can be expressed as 24 hour time. Many electrical items use this format of time.

Example: To convert 3:45 p.m. to 24hr time, add 12. Therefore the time would be **1545**.

It may be written as 15:45 and you say the time is fifteen forty-five. The time 0000 is 12:00 a.m.

Any time expressed as a number greater than 12... indicates a p.m. time.

Task 24

Convert these a.m. and p.m. times to 24hr time.

1.	5:23 a.m.	2.	4:48 p.m.	3.	8:25 a.m.	4.	9:06 p.m.	5.	4:56 a.m.
6.	8:13 p.m.	7.	9:06 a.m.	8.	10:17 p.m.	9.	3:14 a.m.	10.	7:41 p.m.
11.	10:32 a.m.	12.	1:34 a.m.	13.	2:24 p.m.	14.	10:56 a.m.	15.	11:27 p.m.
16.	12:45 a.m.	17.	6:12 p.m.	18.	7:49 a.m.	19.	12:08 p.m.	20.	6:37 a.m.

Convert these 24hr times to a.m or p.m. time.

21.	0256	22.	1236	23.	0859	24.	2006	25.	1049
26.	2132	27.	0714	28.	1827	29.	1014	30.	0853
31.	1452	32.	1942	33.	0048	34.	0914	35.	2358
36.	0146	37.	1636	38.	0523	39.	2243	40.	0009

On Saturday, Stu started a game of golf at 1315 and played for 3 hrs 42 min.

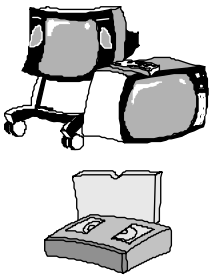
41. At what time did Stu finish playing golf? Give your answer in a.m. / p.m. time.

On Sunday, Stu started playing golf at 9:15 a.m. and finished playing at 1:10 p.m.

42. For how long did Stu play golf on Saturday?

On Wednesday, Stu averaged 7 min 20 sec per hole, for 18 holes of golf.

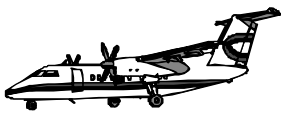
43. How long did this round of golf take?



Kate has a 3 hour video tape and would like to tape all four programmes on one tape. The starting and finishing times of the programmes are shown in this table.

	Start time	Finish time
Programme 1	9:35 a.m.	10:10 a.m.
Programme 2	11:15 a.m.	12:20 p.m.
Programme 3	5:20 p.m.	5:55 p.m.
Programme 4	11:15 p.m.	12:05 a.m.

44. How long is each programme?
45. Can Kate video all three programmes on one 3 hour tape?
46. Convert the start and finish time for each programme to 24hr time.



This timetable shows when buses depart from the city and arrive at the airport.

47. How long does the bus trip take?
48. Complete the last three arrival times, that would appear in the table.
49. Redraw this timetable showing all times as a.m. / p.m. time.

Depart	Arrive
0850	0927
0920	0957
1140	1217
1530	?
1745	?
1950	?

50. During the school day you do lots of different activities, plus you do things after school.
Example: Maths, Science, English, Social Studies, playing sport, playtime, lunch break, homework etc.
Draw up your own **timetable** for a day, showing what you do and when you do it.

Changes over time / Calculating rates:

As time goes by, things change and they can change at various **rates**.

Example: A worker is paid $8.50 / hr, a plant grows at a rate of 7mm per day,
the temperature dropped 3°C in 1 hour, water flows at 120 cubic metres per minute, etc.

Task 25

Sally works in a shop and earns $7.60 per hour.

1. How much would she earn in 12 hours?
2. If Sally earned $49.40, how many hours did she work?

James worked for 25 hours and was paid $140.

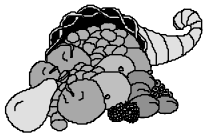
3. Calculate his hourly rate.
4. At an hourly rate of $6.25, how long would it take to earn $200.00?

Paint is sold in various sized containers, ranging from 500mL to 10 litres.
Calculate the price per litre for the following sized paint containers and prices.

5. 500mL for $15.95
6. 2L for $45.30
7. 4L for $69.92
8. 10L for $110.00

At the supermarket, meat is sold by weight and priced accordingly.
Calculate the price for each pack of meat, if the meat sells for $11.90 / kg. Round to the nearest cent.

9. 1.5kg
10. 2.2kg
11. 750g
12. 400g



Calculate the price per kilogram for the following products. Round to the nearest cent.

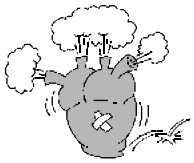
13. 2.5kg of carrots for $1.73
14. 500g of cheese for $3.75.
15. 5kg of potatoes for $3.95
16. 750g of sliced ham for $10.35
17. 1.5kg of sugar for $2.40
18. 25kg of flour for $28.75

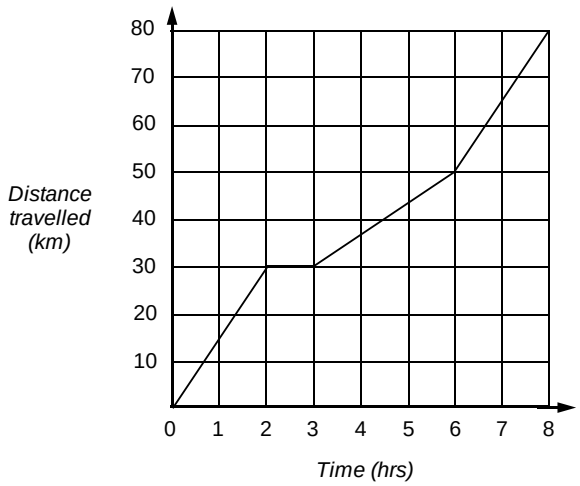
Photocopying A4 sized pages cost a school 1.4 cents per copy. Calculate the cost of photocopying the following number of A4 pages.

19. 2500 copies
20. 32000 copies
21. 102452 copies
22. 452062 copies

Richard's pulse rate averages 72 beats per minute.

23. How many times would Richard's heart beat in 1 hour?
24. How many times would his heart beat in 1 day?
25. **Measure** your own heart rate and **repeat** the two **calculations** above.





This distance / time graph shows the distance Jodie travelled on a bicycle ride during an eight hour trip.

26. During the first two hours, how far did she travel?
27. What was her average speed during this time? Answer in km / hr.
28. Why is the line horizontal during the 3rd hour?
29. What was her average speed for the next 3 hours?
30. How far did she travel in the last 2 hours?
31. What was Jodie's average speed for the 8 hour bicycle journey?
32. If Jodie repeated the same trip with an average speed of 12km / hr, how long would it take?

33. **Perform** a task that changes over time and can be repeated several times. **Graph** your results.
Example: The temperature in the classroom , measured every 30 minutes. **Comment** on your results.

'In-class' Worksheet

Teaching Notes & Answers

How to use this section:
Teaching notes are enclosed in a box with a 'push-pin' at the top left corner. The teaching notes precede the answers for each worksheet / task. The teaching notes have been included to provide assistance and background information about each topic or unit of work.

Introduction:

The topic of Measurement is concerned with gaining an understanding of the importance of having standard units of measure for length, mass and capacity. The various units for length, mass and capacity are revisited, having been introduced at level 4. The ability to estimate and measure accurately using various devices is an important skill. The concepts of perimeter / circumference, area and volume are explored through practical activities. The use of scales and scale diagrams for plans and maps is also revisited as is the ability to convert between analogue, digital and 24 hour time. The concept of 'rate' is introduced in a variety of ways.

Worksheets 1 & 2

Units / conversions associated with length:
Calculations involving mixed length units:

In **Task 1**, pupils are to investigate the metric units for length, converting between various units.

In **Task 2**, pupils are to add and subtract metric length units; however, this can only be done when both units are the same. Therefore pupils are to convert some units before the calculations can be done. Word problems involving length units are also included.

Task 1

1. mm 2. m 3. km 4. m 5. cm or m 6. m 7. m 8. cm 9. mm 10. m 11. Students to answer
12. 10 13. 1 14. 90 15. 3 16. 4 17. 6.7 18. 24.3 19. 36.1 20. 45 21. 83 22. 156 23. 416
24. 1000 25. 100 26. 600 27. 9000 28. 1.90 29. 3.45 30. 9.54 31. 4.65 32. 1.4 33. 7.105
34. 3.456 35. 1.720 36. 1000 37. 1 38. 3.5 39. 5.26 40. 4680 41. 8.65 42. 3750 43. 6042
44. 69300 45. 0.905 46. 14560 47. 785 48. 1.67m 49. 3200m 50. 346mm 51. 275cm 52. 65cm
53. 9.5m 54. 12.08m 55. 12.5km 56. 1050mm 57. 1.426m

Task 2

1. 65.6 2. 12 3. 5.48 4. 3.472 5. 9.298 6. 32.51 7. 10.34 8. 2.124 9. 15.23 10. 745.4
11. 14675 12. 44.4 13. 8841 14. 7.86 15. 5930 16. 60 bricks 17. 480 bricks 18. $168 19. 4.71m
20. $65.23 21. 3600m or 3.6km 22. 4 laps 23. 50 laps 24. 60000m or 60km 25. 6.48m 26. $50.87
27. 12.1m, 1210cm, 12100mm 28. 2.42 rolls 29. $32.07

Worksheets 3 & 4

Units / conversions associated with mass (weight):
Calculations involving mixed mass units:

In **Task 3**, pupils are to investigate the metric units for mass (weight), converting between various units.

In **Task 4**, pupils are to add and subtract metric mass units. However, this can only be done when both units are the same. Therefore pupils have to convert some units before the calculations can be completed. Word problems involving mass units are also included.

Task 3

1. t 2. mg 3. kg 4. t 5. kg 6. g 7. g or mg 8. g or mg 9. kg 10. mg 11. Students to answer
12. 1000 13. 1 14. 9000 15. 8 16. 4900 17. 8100 18. 2780 19. 43600 20. 0.635 21. 0.975
22. 424 23. 963 24. 1000 25. 1 26. 6000 27. 6125 28. 4300 9. 6.6 30. 8350 31. 4.29
32. 1.75 33. 1050 34. 864 35. 0.706 36. 1000 37. 1 38. 2600 39. 5.3 40. 3950 41. 9450
42. 6340 43. 9256 44. 5.715 45. 0.635 46. 476 47. 0.915 48. 5.623kg 49. 2050g 50. 1250kg
51. 12.5t 52. 1.25g 53. 2450mg 54. 0.865t 55. 23mg 56. 520kg 57. 13.5kg

Task 4

1. 11325 2. 3.06 3. 10.39 4. 1152 5. 5600 6. 1.66 7. 15.77 8. 5.055 9. 15.904 10. 1774
11. 9705 12. 1.435 13. 1281.263 14. 3180 15. 7.96 16. 40.369kg 17. $641.87 18. 50 packets
19. $197.50 20. 1440kg = 1.44t 21. $0.64 or 64c 22. 160 buns 23. $0.16 or 16c 24. 6059kg 25. 9
26. 9.59t = 9590kg 27. 3kg of butter, 2.16kg of sugar 28. $16.50 29. $6.70 30. 20 batches
31. 33.3· batches

Worksheets 5 & 6

Units / conversions associated with capacity (volume):
Calculations involving mixed capacity units:

In **Task 5**, pupils are to investigate the metric units for capacity (volume), converting between various units.

In **Task 6**, pupils are to add and subtract metric capacity units. However, this can only be done when both units are the same. Therefore pupils have to convert some units before the calculations can be completed. Word problems involving capacity units are also included.

Task 5

1. mL 2. mL or L 3. L 4. mL or L 5. mL 6. mL 7. L 8. L 9. kL 10. L 11. Students to answer
12. 1000 13. 1 14. 8000 15. 9 16. 9600 17. 4.7 18. 1270 19. 2260 20. 0.526 21. 0.637
22. 395 23. 842 24. 1000 25. 1 26. 7000 27. 3 28. 6700 29. 5.2 30. 3650 31. 4015
32. 3090 33. 7.435 34. 395 35. 0.532 36. 7014 37. 1.952 38. 8.525 39. 746 40. 0.634
41. 3254 42. 4652 43. 5.33 44. 459 45. 0.429 46. 202 47. 0.372 48. 1.25L 49. 1500mL
50. 0.25L 51. 25000L 52. 15kL 53. 850L 54. 25L 55. 75000L 56. 750mL 57. 0.005L

Task 6

1. 4690 2. 3.76 3. 17.49 4. 4880 5. 5.74 6. 1.395 7. 7.27 8. 3.345 9. 11980 10. 1192
11. 9009 12. 2.16 13. 7.759 14. 1370 15. 2 16. 10.06L 17. 30 jars 18. $75
19. 31500 at 750kL/hr = 42hrs 20. $393.75 21. 16.3L 22. 49L 23. $622.65 24. 0.84L 25. 12 days
26. 50 days 27. $12.00 28. 17875L or 17.875kL

Worksheet 7

Reading scales:

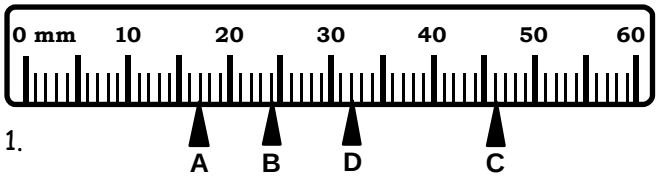
In **Task 7**, pupils are to list the position of pointers on various diagrams of scales. Pupils are to state the unit of measurement and the smallest division for each scale. A **'Marking Scales'** master sheet has been provided so that pupils can mark given points on various scales. The most important measurement instruments that pupils must be confident in using are rulers and protractors.

Task 7

1. Units are millimetres, each division = 1mm. *A* = 53mm, B = 27mm, *C* = 19mm, D = 8mm, E = 38.5mm
2. Units are degrees, each division = 1°. *A* = 80°, B = 5°, *C* = 122°, D = 38°, E = 162°
3. Units are metres, each division = 10cm or 0.1m. *A* = 5.3m, B = 1.5m, *C* = 2.7m, D = 0.35m, E = 4.15m
4. Units are kilometres per hour, each division = 10km/hr. *A* = 10km/hr, B = 90km/hr, *C* = 65km/hr, D = 35km/hr

5. Units are kilograms, each division = 5kg. A = 10kg, B = 135kg, C = 90kg, D = 40kg, E = 57.5kg
6. Units are centimetres, each division = 2mm or 0.2cm. A = 3cm, B = 5.6cm, C = 0.8cm, D = 10.4cm, E = 8.45cm
7.

1.



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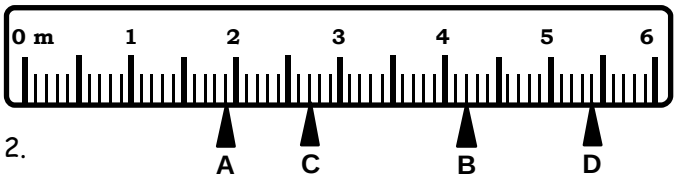

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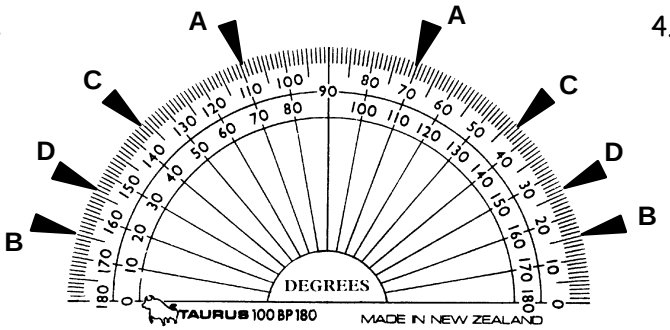

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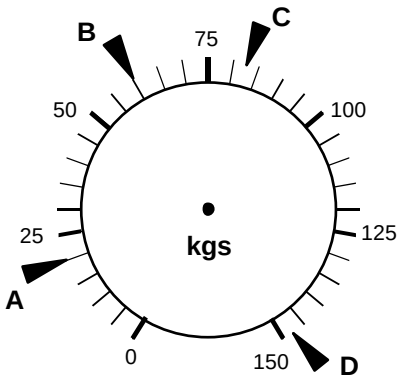

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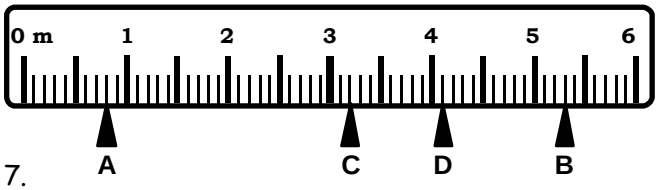

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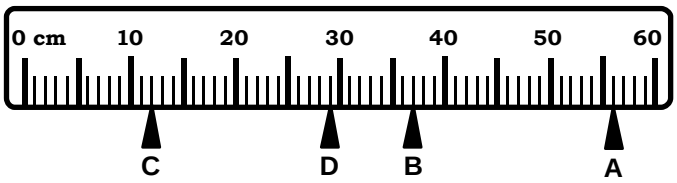

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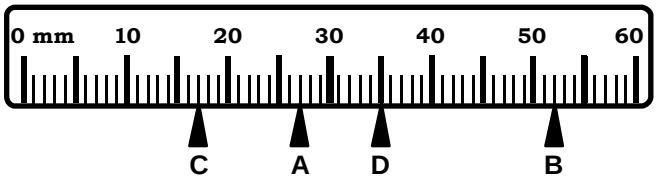


Worksheet 8

Accuracy of measurement:

The accuracy of a measurement will depend on the smallest division of the scale on the measuring device and what is being measured.

Example: The distance between two towns is described as 25.5km. To say that the towns are 25.487km apart is too accurate and most probably unnecessary, therefore the distance could be given as 25.5km ± 0.5km.

In **Task 8**, pupils give the mimimum and maximum measurements, given the degree of accuracy or variation. The symbol '±' means 'plus or minus'. Pupils are to measure lines to the nearest millimetre ± 1mm.

In **Task 9**, pupils are to look at various measurement devices and to determine the degree of accuracy for each device. Using several devices, pupils are to measure various items.

Task 8

1. 36mm, 38mm 2. 41cm, 43cm 3. 1449m, 1451m 4. 233mm, 239mm 5. 87mL, 91mL 6. 74g, 80g
7. 628km, 632km 8. 27mg, 35mg 9. 6.3m, 6.5m 10. 8.4kg, 8.8kg 11. 108.44m, 108.54m 12. 8.9L, 9L
13. 3.213m, 3.223m 14. 2.023g, 2.073g 15. 3.792L, 4.092L 16. 1.092mg, 1.592mg 17. 138mm ± 1mm
18. 70mm ± 1mm 19. 149mm ± 1mm 20. 56mm ± 1mm 21. 79mm ± 1mm 22. 138mm ± 1mm 23. 12mm ± 1mm
24. 87mm ± 1mm 25. 96mm ± 1mm 26. 32mm ± 1mm 27. 25mm ± 1mm

Worksheets 9 to 11

Finding the perimeter of a shape:
Word problems involving perimeter:
Finding the circumference of a circle:

In **Task 10**, pupils are to find the perimeter of various shapes, either by adding the sides given on a shape or by measuring the sides of a shape so that the perimeter can be calculated. A good way to describe perimeter is to imagine you are going to walk along the sides of a shape, until you are back where you started. The distance travelled would be the perimeter.

In **Task 11**, pupils are to find the perimeter of various items within the classroom or outside.
Example: The perimeter of a desk top or of a tennis / basketball / netball court. This task will involve measuring, but pupils could use their hands or feet as 'measuring, instruments, if ruler and tape measures are not available.

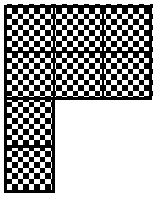
In **Task 12**, pupils are to answer word problems of practical situations that involve finding the perimeter of various shapes.

In **Task 13**, pupils are to find the circumference of a circle, an alternative name for perimeter. By using string and a ruler, pupils are to attempt to find the relationship between the length of the circumference of a circle and the diameter of the same circle. From this, pupils are to come up with a rule, C = approx. 3 × d, which can be used to find the circumference of a circle, given the diameter. The concept of **'pi'** is to be introduced, using 3.14 as an approximation for 'pi'.

Task 10

1. 8.34cm 2. 87.5cm 3. 8.14cm 4. 53.3mm 5. 26cm 6. 92mm 7. 94.2mm 8. 8.58cm
9. AB = 159.5mm ± 0.5mm, BC = 10mm ± 0.5mm, CD = 159.5mm ± 0.5mm, DA = 10mm ± 0.5mm
   Minimum perimeter = 159 + 9.5 + 159 + 9.5 = 337mm
   Maximum perimeter = 160 + 10.5 + 160 + 10.5 = 341mm
10. AB = 62mm ± 0.5mm, BC = 15mm ± 0.5mm, CD = 34.5mm ± 0.5mm, DE = 34.5mm ± 0.5mm, EA = 15mm ± 0.5mm
   Minimum perimeter = 61.5 + 14.5 + 34 + 34 + 14.5 = 158.5mm
   Maximum perimeter = 62.5 + 15.5 + 35 + 35 + 15.5 = 163.5mm
11. AB = 72.5mm ± 0.5mm, BC = 28mm ± 0.5mm, CD = 24mm ± 0.5mm, DE = 15mm ± 0.5mm, EF = 28mm ± 0.5mm, FA = 42.5mm ± 0.5mm
   Minimum perimeter = 72 + 27.5 + 23.5 + 14.5 + 27.5 + 42 = 207mm
   Maximum perimeter = 73 + 28.5 + 24.5 + 15.5 + 28.5 + 43 = 213mm

Task 12

1. 25000m 2. 25km 3. 75000m or 75km 4. 5 laps 5. 2hrs 46mins 40secs 6. 139.4 - 2.5 = 136.9m
7. $2395.75 8. 6.25m 9. 3.7m, 1.8m, 4.5m 10. $119.50 11. 7m, 5.1m, 7.8m 12. $8.96 13. 14.7m
14. $21.70/m 15. 2590mm 16. $0.91 or 91c 17. 30cm
18. e.g. 
19. 

Task 13

1 - 3. Students to answer 4. C = 62.8cm 5. C = 37.68cm 6. C = 75.36m 7. C = 4.71m 8. C = 113.04mm
9. C = 50.24cm 10. C = 157cm 11. C = 15.07mm 12. C = 11.30km 13. 3.77m 14. C = 143.81mm

'If you can paint it, it has area':
Finding the area of a triangle:
Finding the area of a parallelogram:
Finding the area of a trapezium:
Finding the area of a circle:

In **Task 14**, pupils are introduced to area by way of an estimation activity. Area is defined as the amount of surface a shape takes up and the saying 'If you can paint it, it has area' is a good way to think of area. Having established a rule for finding the area of squares and rectangles, pupils are to calculate areas without having to count squares. An extension exercise involves finding the length of the base or height of a square or rectangle, given the area.

In **Task 15**, pupils are shown how the area rule for squares and rectangles has been adapted to create the area rule for a triangle. Using this rule, the areas of various triangles are to be found. Practical word problems are included.

In **Task 16**, pupils are shown how the area rule for squares and rectangles has been adapted to create the area rule for a parallelogram. Using this rule, the areas of various parallelograms are to be found. Practical word problems are included, plus the area of compound shapes.

In **Task 17**, pupils are shown how the area rule for squares and rectangles has been adapted to create the area rule for a trapezium. Using this rule, the area of a trapezium can be found. Practical word problems are included. An extension exercise involves finding the length of one missing side or the height of a trapezium, given the area.

In **Task 18**, pupils are shown how the area rule for a parallelogram has been adapted to create the area rule for a circle. Using this rule, the areas of various circles are to be found. Practical word problems are included, plus the area of compound shapes.

Task 14

1. 24 squares 2. 24 squares 3. 23 squares 4. 16 squares 5. Area = base x height 6. 2.43cm^2 7. 390mm^2
8. 361m^2 9. 21.5cm^2 10. 324m^2 11. 12.42cm^2 12. 720mm^2 13. 625m^2 14. 20 x 20 = 400mm^2
15. 50 x 15 = 750mm^2 16. 45 x 18 = 810mm^2 17. 8cm 18. 8m 19. 11mm 20. 15cm

Task 15

1. 90° or a right angle 2. 1.26cm^2 3. 168mm^2 4. 1.71cm^2 5. 169mm^2 6. 240mm^2 7. 1.2936m^2
8. 1.862m^2 9. 2.204m^2 10. 0.527cm^2 11. 0.8084cm^2 12. 12cm 13. 10.5cm 14. 24cm 15. 7.2cm
16. 19.44m^2 17. 1.296 litres of paint 18. 1.8m 19. 7.64m^2 20. $2470.78 21. 6.615m^2 22. 75.33 tiles
23. $349.62 24. $314.66 25. Students to answer

Task 16

1. 2.7m^2 2. 208mm^2 3. 20.09mm^2 4. 640m^2 5. 208mm^2 6. 405m^2 7. 15.54cm^2 8. 1.82m^2
9. 27000mm^2 10. 17.68m^2 11. 9cm 12. 8mm 13. 4cm 14. 4.5cm 15. 3.15m^2 16. 12.6m^2 17. 630 tiles
18. $963.90 + labour = $1213.90 19. 8.97cm^2 20. 670mm^2 21. 864mm^2 22. 4.575m^2

Task 17

1. 397.5mm^2 2. 360mm^2 3. 232m^2 4. 273cm^2 5. 3.08cm^2 6. 530cm^2 7. 17.34m^2 8. 770mm^2
9. 7.68mm^2 10. 6.86m^2 11. 2448000mm^2 12. 3.96m^2, $338.58 13. 10mm 14. 17m 15. 15cm 16. 3.6mm 17. 40mm

Task 18

1. 314.00cm^2 2. 706.50cm^2 3. 1256.00cm^2 4. 452.16cm^2 5. 1962.50cm^2 6. 875mm, 0.875m 7. 2.40m^2
8. $547.44 9. 1.75m radius, 9.62m^2 10. 2m radius 11. 12.56m^2 – 9.62m^2 = 2.94m^2 12. $447.55 13. 18.09m^2
14. 69.66cm^2 15. 79.96cm^2 16. 849.97mm^2 17. 216.00cm^2 18. 4.36cm^2

Worksheets 17 to 19

'If you can fill it, it has volume':
Finding the volume of a cube or similar shape:
More volume problems involving various prisms:

In **Task 19**, pupils are introduced to volume by way of counting the number of cubes in a pile. Volume can be described as the amount of space a 3D object takes up, or the amount of liquid a 3D object will hold. In the previous task, area of a square or rectangle is defined as ... **A = bh**. If a 2D shape is extended in a third dimension, called depth, the volume of such a 3D object is defined as ... **V = bhd**. In this task, pupils are to calculate the volume of an object, given the cross-sectional area of the end, and the depth. Pupils are to draw 3D shapes, given the volume as a number of cubes, on isometric paper.

In **Task 20**, pupils are to use the rule ... **Volume = base × height × depth**, to calculate the volume of simple 3D objects - cubes and rectangular prisms. Practical problems involving volume are also included.

In **Task 21**, pupils are to find the volume of various prisms based on the area formula for the 2D shape, that is, the cross-section of each prism. The 3D prisms will have either a triangle, parallelogram or trapezium, as a cross-section. Practical problems involving volume are included.

Task 19

1. 14 cubes 2. 16 cubes 3. 20 cubes 4. 22 cubes 9. 6 squares 10. $27cm^3$ 11. $54m^3$ 12. $35cm^3$
13. $30000mm^3$ 14. $1.35cm^3$ 15. $264cm^3$ 16. $900cm^3$ 17. $31.5m^3$ 18. $26cm^3$ 19. $15m^3$

Task 20

1. $720cm^3$ 2. $9000mm^3$ 3. $25m^3$ 4. $17.85cm^3$ 5. $38m^3$ 6. $0.14m^3$ 7. $1.12m^3$ 8. $13.5m^3$ 9. $762.75
10. $3150cm^3$ 11. base = 75cm, height = 30cm, depth = 7cm, V = $15750cm^3$ 12. $143m^3$ 13. 0.5m or 50cm
14. 0.825m or 82.5cm 15. 4hrs 5min

Task 21

1. $180cm^3$ 2. $1461.67mm^3$ 3. $368.9m^3$ 4. $967.73m^3$ 5. $28.08m^3$ 6. 1.87 min or 1 min 52.32 sec 7. $0.99m^3$
8. $564.30 9. $5400cm^3$ 10. 133.3 blocks 11. 6cm 12. 6.5cm 13. 1.3cm 14. 12cm 15. 4.9m

Worksheet 20

Understanding and using scale diagrams:

In **Task 22**, pupils are to study scale diagrams. By measuring parts of the diagram and using the scale provided, the measured length can be converted to the actual length. Pupils are to create their own maps, with a scale, and exchange the maps with classmates so that he / she can work out distances between features on the map.

Task 22

1. 60mm 2. 9m 3. 55mm 4. 11m 5. 50mm 6. 1.25m 7. - 8. 37mm, 18.5km 9. 80mm, 40km
10. 67mm, 33.5km 11. 27mm, 13.5km 12. 60mm, 30km 13. 60mm, 30km 14. 60mm, 30km 15. 41mm, 20.5km

Worksheets 21 to 23

Understanding time units / Analogue & digital time:
Converting between a.m / p.m. and 24hr time:
Changes over time / calculating rates:

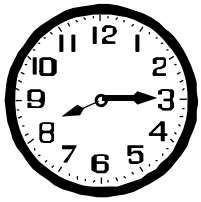
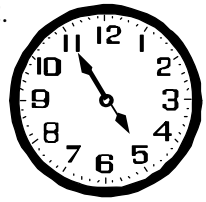
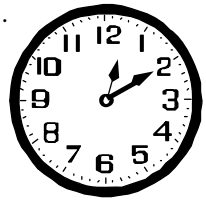
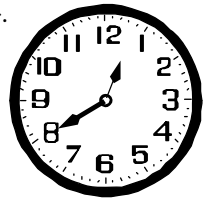
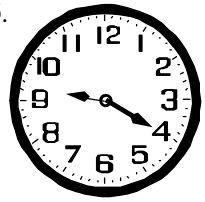
In **Task 23**, pupils are to revise the basic time units and convert between different time units. The ability to tell the time is an important skill, and pupils are to read and display time in analogue and digital form. This task is completed by pupils adding and subtracting mixed time units.

In **Task 24**, pupils are to convert between a.m. / p.m. time and 24hr time and attempt questions associated with time. A series of word problems are also included.

In **Task 25**, pupils are to interpret and use information about rates and changes over time as illustrated by everyday situations.

Task 23

1. 300 sec 2. 375 min 3. 114 hrs 4. 77 days 5. 26 wks 6. 366 days 7. 7.25 min 8. 405 sec
9. 2.75 hrs 10. 4.3 hrs 11. 2.25 days 12. 3.75 days 13. 6.5 wks 14. 80.5 wks 15. - 16. 20 past 10
17. 20 to 2 18. 5 to 3 19. 25 past 11 20. 10 to 1

21. 
22. 
23. 
24. 
25. 

26. 10:20, 01:40, 02:55, 11:25, 12:50, 08:15, 04:55, 12:10, 12:40, 09:20 27. 285 sec 28. 35 sec 29. 7.5 min
30. 2.75 min 31. 450 min 32. 0.75 hrs 33. 8 hrs 34. 315 min 35. 63 hrs 36. 18 hrs 37. 6.25 days
38. 2.5 days 39. 4.5 wks 40. 38.5 days 41. 8.5 wks 42. 8 hrs 43. 8.75 hrs 44. 0.5 hrs 45. 405 min
46. 5 min 47. 69 hrs

Task 24

1. 0523 2. 1648 3. 0825 4. 2106 5. 0456 6. 2013 7. 0906 8. 2217 9. 0314 10. 1941
11. 1032 12. 0134 13. 1424 14. 1056 15. 2327 16. 0045 17. 1812 18. 0749 19. 1208 20. 0637
21. 2:56 a.m. 22. 12:36 p.m. 23. 8:59 a.m. 24. 8:06 p.m. 25. 10:49 a.m. 26. 9:32 p.m. 27. 7:14 a.m.
28. 6:27 p.m. 29. 10:14 a.m. 30. 8:53 a.m. 31. 2:52 p.m. 32. 7:42 p.m. 33. 12:48 a.m. 34. 9:14 a.m.
35. 11:58 a.m. 36. 1:46 a.m. 37. 4:36 p.m. 38. 5:23 a.m. 39. 10:43 p.m. 40. 12:09 a.m. 41. 4:57 p.m.
42. 3 hr 55 min 43. 132 min or 2 hr 12 min 44. Prog 1 = 35 min, Prog 2 = 65 min, Prog 3 = 35 min, Prog 4 = 50 min
45. no 46. 0935 - 1010, 1115 - 1220, 1720 - 1755, 2315 - 0005 47. 37 min 48. 1607, 1822, 2027
49.

Depart	Arrive
8:50 a.m.	9:27 a.m.
9:20 a.m.	9:57 a.m.
11:40 a.m.	12:17 p.m.
3:30 p.m.	4:07 p.m.
5:45 p.m.	6:22 p.m.
7:50 p.m.	8:27 p.m.

Task 25

1. $91.20 2. 6.5 hrs 3. $5.60 / hr 4. 32 hrs 5. $31.90 6. $22.65 7. $17.48 8. $11.00 9. $17.85
10. $26.18 11. $8.925 or $8.93 12. $4.76 13. 69c 14. $7.50 15. 79c 16. $13.80 17. $1.60
18. $1.15 19. $35 20. $448 21. $$1434.328 or $1434.33 22. $6328.868 or $6328.87 23. 4320 beats
24. 103680 beats 25. - 26. 30km 27. 15km / hr 28. Jodie was resting 29. 6.7km / hr 30. 30km
31. 10km / hr 32. 6 hrs 40 min

Table of Contents for the Homework / Assessment Worksheet Masters for Measurement, Level 5

Revision

Measurement

Homework / Assessment Worksheet

L5MM

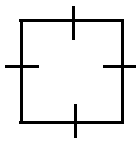
1

Term: **Week:** **To be completed by:**

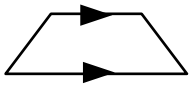
A: 10 Quick Questions

1. Find 10% of $53.60 .....
2. 61 - 7 × 7 = ...
3. Find $\sqrt{81}$ = ...
4. If the temperature was 8°C,then drops 9°C, what is the new temperature? .....
5. 9.4 × 0.005 = ...
6. How many seconds in 9.5 minutes? .....
7. $7.60 × 13 = ...
8. 108 ÷ 1.2 = ...
9. How many weeks in 4 years? .....
10. Find $\frac{1}{2}$ of $27.50 .....

B: What does it mean?



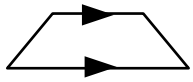
1. What do the small lines on each side mean? .....
2. What do the arrows on each side mean? .....



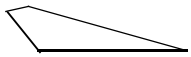
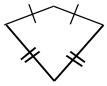
C: What Shape is it?

Name these shapes using the list below (Use one name twice)

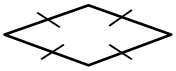




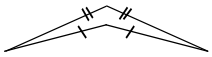
1. ..... 2. ..... 3. .....

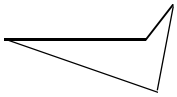




4. ..... 5. ..... 6. .....

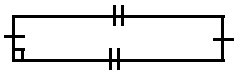
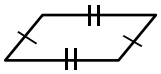
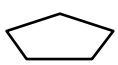




7. ..... 8. ..... 9. .....





10. ..... 11. ..... 12. .....

13. ..... 14. ..... 15. .....

trapezium rhombus hexagon rectangle kite
quadrilateral square parallelogram octagon
oval arrowhead triangle pentagon circle

D: Metric Measurement

In the metric system there are many abbreviations that are used. Match the abbreviations listed with the words below.

1. mg ..... 2. L .....
3. kg ..... 4. cm .....
5. mm ..... 6. m .....
7. mL ..... 8. g .....
9. kL ..... 10. km .....

gram kilolitre milligram centimetre
millimetre litre kilogram
metre millilitre kilometre

E: Choose the right unit

Which unit for length, capacity or weight would you use to measure the following?

1. the distance between two countries .....
2. the volume of water in a swimming pool .....
3. a dose of cough medicine .....
4. a packet of MM's .....
5. the height of the classroom .....
6. the weight of a person .....
7. a bucket of water .....
8. the height of a tree .....
9. a packet of biscuits .....
10. the thickness of a match stick .....
11. the weight of a feather .....
12. the thickness of a tooth pick .....
13. a child's height .....

Comments:

Please sign:
Parent / Caregiver

AWS

Measurement

Revision

Homework / Assessment Worksheet

L5MM

2

Term: **Week:** **To be completed by:**

A: 10 Quick Questions

1. 34 - 7 × 4 = ...
2. Find the area of a rectangle with a base of 9cm and a height of 7cm. .....
3. $^{-}17 + ^{-}14$ = ...
4. How many months in 3.5 years? .....
5. 0.45 × 0.09 = ...
6. How many seconds in 3.75 minutes? .....
7. $9.45 × 12 = ...
8. 9.6 ÷ 1.2 = ...
9. Find 25% of $18.40 .....
10. $\frac{3}{4}$ of 320km .....

B: The Metric System

Match the answers below with the questions for each equivalent metric measurement. (*Example:* 1 metre = 100 cm)

1. 1 km = ...
2. 1000 mL = ...
3. 1 litre = ...
4. 1 kL = ...
5. 1000 m = ...
6. 10 mm = ...
7. 1 m = ...
8. 1000 g = ...
9. 1 tonns = ...
10. 1000 mg = ...

1 cm	1000 mm	1000 m	1 L	1000 kg
1 km	1 kg	1 g	1000 mL	1000 L

C: Metric Conversions

Convert the following.

1. 8cm = ... mm
2. 7000m = ... km
3. 1.7kg = ... g
4. 5m = ... cm
5. 320mm = ... cm
6. 5900L = ... kL
7. 0.73m = ... cm
8. 620cm = ... m
9. 5tonne = ... kg
10. 61mm = ... m
11. 5.4m = ... mm
12. 916mg =..... g
13. 6.9tonne..... kg
14. 385mL = ... L
15. 4.6L = ... mL
16. 1.85g = ... mg
17. 3480m = ... km
18 0.86kg = ... g
19 57.9cm = ... mm
20. 0.41m = ... cm
21. 6.79g = ... mg
22. 904mL = ... L
23. 0.74kg = ... g
24. 87.7cm = ... mm
25. 3170m = ... km

D: Add or Subtract these different Metric Units

Answer in centimetres.

1. 1.8m + 53cm = ...
2. 5.1m + 67cm + 190mm = ...
3. 9.1m - 860cm = ...
4. 870cm - 3.07m = ...
5. 3.2m - 570mm + 95cm = ...

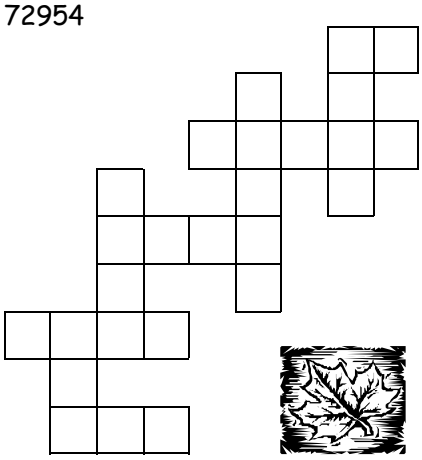
Answer in kilograms.

6. 1.9kg + 8700g = ...
7. 3067g + 4794g = ...
8. 349g + 647g = ...
9. 9060g - 3.7kg = ...
10. 3.75kg - 2345g = ...

F: Where do they Go?

Place the numbers in the grid.

65, 415, 543, 3452, 3921
6254, 6315, 72114,
72954



E: Word Problems

1. If 1kg of apples costs $1.35, what does 8kgs cost? .....
2. If 1L of milk costs $1.45, what would 9L cost? .....
3. A particular shape and size of wood costs $3.25 per metre. How much would 20m cost? .....
4. If 10kg of potatoes costs $6.30, what would 1kg cost? .....
5. If 5kg of meat costs $69.75, what would 1kg cost? .....
6. If 12m of timber costs $36.60, what would 1m cost? .....
7. If 1.5kg of carrots costs $2.10, what would 1kg cost? .....
8. A 350mL bottle of shampoo costs $6.30. How much does it cost per mL? .....
9. Dried fruit is on sale for $11.75 per kg or it is sold for $1.25 per 100g. Which is the cheapest way to buy the dried fruit ? .....

Comments:

Please sign:
Parent / Caregiver

AWS

Measurement

M1 / M2

Homework / Assessment Worksheet

L5MM

3

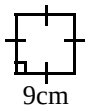
Term: **Week:** **To be completed by:**

A: 10 Quick Questions

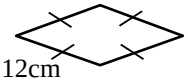
1. 103 - 8 × 12 = ...
2. Divide $54 in a ratio of 4 : 5 .....
3. 9.3 - 4.953 = ...
4. How many metres in 8.105km? .....
5. Round off 24.9 to one significant figure .....
6. How many minutes in 510 seconds? .....
7. $9.25 × 6 = ...
8. 169 ÷ 0.13 = ...
9. What does kg stand for? .....
10. Draw a rhombus

B: How far is it around the outside ?

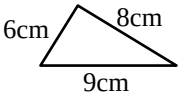
Find the perimeter of each shape.



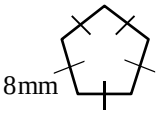
1. .....



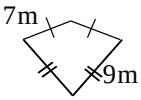
2. .....



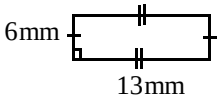
3. .....



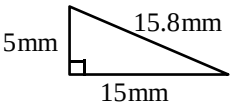
4. .....



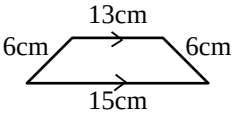
5. .....



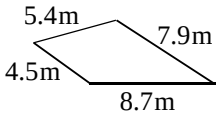
6. .....



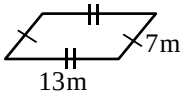
7. .....



8. .....



9. .....

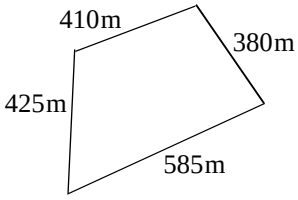


10. .....

C: Word Problems

1. Rangi and Andrew have a race twice around a soccer field. If the length of the field was 110m and the width was 70m, how far was the race ?

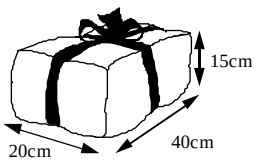
.....



This is a sketch of a park where a school cross-country race is to be held.

2. How many metres is it for one lap around the outside? .....
3. How many laps will they need to run if the race is 9 km long? .....

4. Mr. Walker is going to build a fence around his section. The section is rectangular with a width of 48m and a length of 72.5m. How far is it around the section? .....

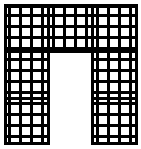


5. **Calculate** the length of ribbon that is needed to go around the parcel, then add 60cm to allow for a bow to be tied.

.....

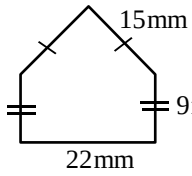
6. For a meeting, 7 square tables, each with sides of 0.85m, are placed as shown. What is the perimeter of this grouping? .....

.....

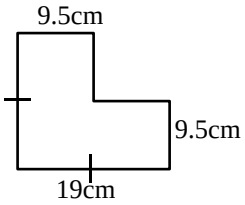


D: Compound Shapes

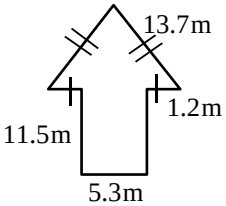
Find the perimeter of these shapes.



1. .....
.....
.....
.....

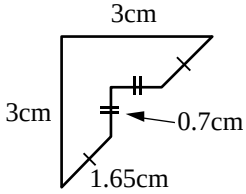


2. .....
.....
.....
.....



3. .....
.....
.....
.....

4. .....
.....
.....
.....



Comments:

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AWS

Measurement

M1 / M2

Homework / Assessment Worksheet

L5MM

4

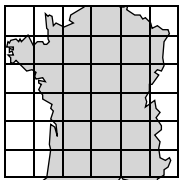
Term: **Week:** **To be completed by:**

A: 10 Quick Questions

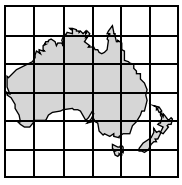
1. 4(7 + 6 × 5) = ...
2. Divide $81 in a ratio of 5 : 4 .....
3. 17.5 - 9.153 = ...
4. How many kilometres in 6250m? .....
5. Round off 47.36 to one decimal place .....
6. Find the perimeter of a square with sides of 13cm .....
7. Calculate $\sqrt{196}$ = ...
8. Solve ♥ + 37 = 19
   ♥ = ...
9. 18.4 × 0.019 = ...
10. $^{-}19 + {}^{-}15$ = ...

B: Find the Areas?

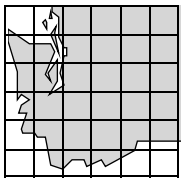
Find the approximate areas of each shape by counting squares and part squares.



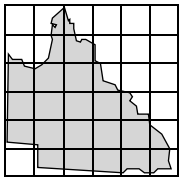
1. .....



2. .....



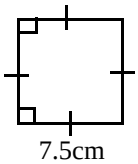
3. .....

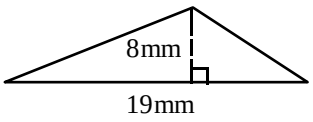


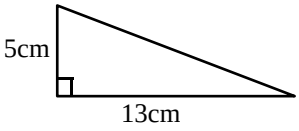
4. .....

C: "If you can paint it, it has Area"

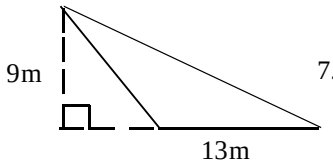
Find the areas of these shapes.

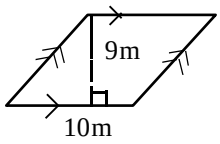






1. .....
   .....
2. .....
   .....
3. .....
   .....

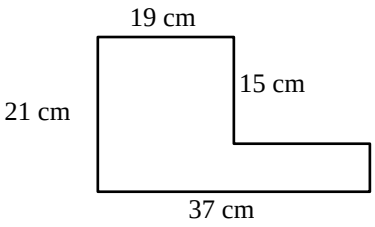


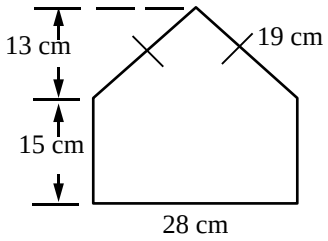


4. .....
   .....
5. .....
   .....
6. .....
   .....

D: Compound shapes

Find the area of each compound shape.





1. .....
   .....
2. .....
   .....

E: Word Problems

Wendy is going to paint her bedroom door, but needs to first work out its area, so she can buy enough paint.

1. If the door is 2.00m by 0.85m, what is the area of one side of the door? .....

2. If the door is to have 2 coats of paint on both sides, what is the total area that has to be painted?
   .....
3. If a 500mL tin of paint will paint 8m^2, what volume of paint is required to be able to paint the door? .....

4. If a 500mL tin of paint costs $14.35, how many tins will be needed and what will it cost?
   ..... tins $.....

F: Magic Squares

Find the missing numbers.

		16
	11	7
6		

	20	
	14	
19	8	

Comments:

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AWS

M1 / M2

Measurement

Homework / Assessment Worksheet

L5MM

5

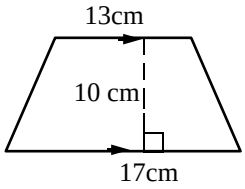
Term: **Week:** **To be completed by:**

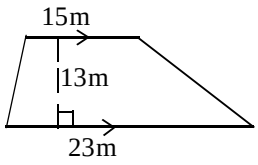
A: 10 Quick Questions

1. 1.93 + 4.76 = ...
2. Find the next number in the series
   3, 11, 19, ...
3. How many grams in 5.3kgs? .....
4. How many degrees in a triangle? .....
5. 0.015 × 0.9 = ...
6. Round off 69.145 to 2 d.p.
   .....
7. $\frac{1}{2} + \frac{1}{4}$ = ...
8. 13.2 ÷ 1.2 = ...
9. How many weeks in 2.25 years ? .....
10. Find the perimeter of a square with sides of 15cm
    .....

B: Finding the area

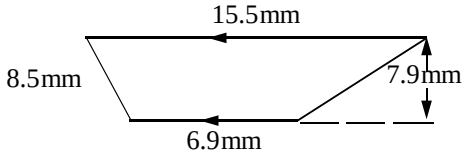
Use the formula $A = \frac{1}{2}(a + b)h$ to find the areas of these trapezia.

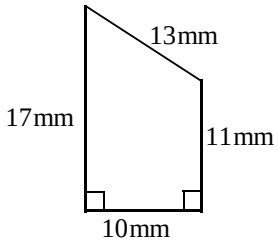




1. .....
   .....

2. .....
   .....



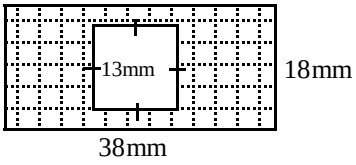


3. .....
   .....

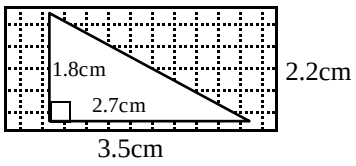
4. .....
   .....

C: Shaded Area

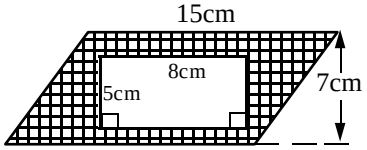
Find the area of the shaded part of each diagram.



1. .....
   .....



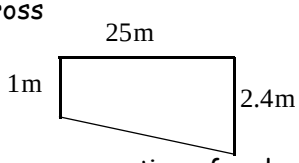
2. .....
   .....

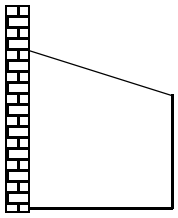


3. .....
   .....

D: Word Problems

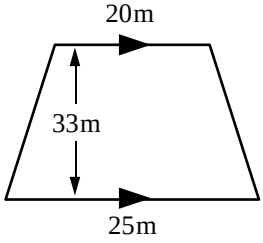
1. A school swimmng pool has a cross section as shown in the diagram. What is the area of the cross section of the swimming pool?
   .....
   .....

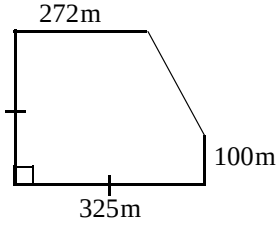




2. This diagram shows the cross section of a glass house built against a brick fence. If it is 2.7 metres high at the back, 2 metres at the front and 4 metres from the fence, what is the area of the cross section? .....
   .....

3. This sketch is of a section of land at the end of a 'No Exit' street. Calculate the area.
   .....
   .....





4. This sketch is of a paddock which is to be planted in grass. Calculate the area of this paddock.
   .....
   .....

Comments:

Please sign:
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AWS

Measurement

L5MM

6

M1 / M2

Homework / Assessment Worksheet

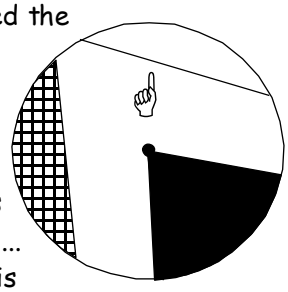
Term: **Week:** **To be completed by:**

A: 10 Quick Questions

1. Calculate the area of a triangle which has a base of 15cm and a height of 18cm .....
2. Convert 84mm to cm .....
3. Write 61000 in standard form .....
4. How many minutes from 1.42 a.m. to 4.28 a.m. on the same day? .....
5. $20^2 - \sqrt{225}$ .....
6. How many degrees in a 4 sided figure? .....
7. \$8.75 × 11 = ...
8. 71 - 42 ÷ 7 = ...
9. 19 + ⁻11 - ⁻8 = ...
10. $(^-9)^2$ = ...

B: Which part is it ?

Use the list below and the diagram to answer these questions.

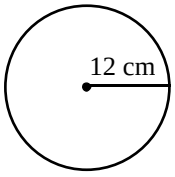


1. The point at the middle of a circle is called the .....
2. A line from the middle to the outside of the circle is called the .....
3. A line passing through the middle of the circle, going from one side to the other is called the .....
4. The line around the outside of the circle is called the .....
5. The area shaded ■ is called a .....
6. The area shaded ▦ is called a .....
7. Part of the line around the outside is called an .....
8. The line in the diagram with the ☝ symbol pointing to it, is called a .....

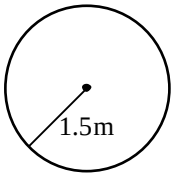
circumference sector diameter centre segment arc radius chord

C: Circle Calculations

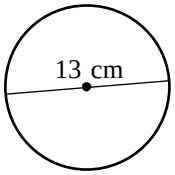
Use $C = 2\pi r$ or $C = \pi d$ and $A = \pi r^2$ to find both the **circumference** and **area** of each circle (use $\pi = 3.1$).

1. 

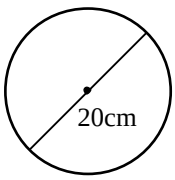
C = ...
.....
A = ...
.....

2. 

C = ...
.....
A = ...
.....

3. 

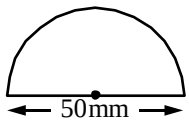
C = ...
.....
A = ...
.....

4. 

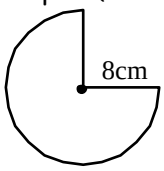
C = ...
.....
A = ...
.....

D: Word Problems

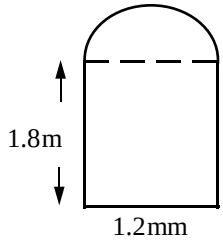
Calculate the **area** of these shapes. (use $\pi = 3.1$)

1. 

.....
.....

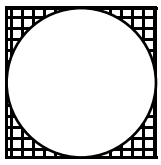
2. 

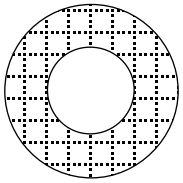
.....
.....

3. 

.....
.....

4. A circle is drawn inside a square so that the sides of the circle just touch the sides of the square. Calculate the area of the shaded region (use $\pi = 3.14$).
.....
.....





5. Calculate the shaded X-sectional area of this pipe if the inner circle has a radius of 12 cm, and the outer circle has a radius of 24 cm (use $\pi = 3.14$).
.....
.....

6. Find out the diameter or radius of the world and calculate the circumference of the world at the equator (use $\pi = 3.14$).
.....
.....

Comments:

Please sign:
Parent / Caregiver

AWS

M2

Measurement

Homework / Assessment Worksheet

L5MM

7

Term: **Week:** **To be completed by:**

A: 10 Quick Questions

1. $9 + {}^{-}16 =$ .....
2. ${}^{-}10 \times {}^{-}9 =$ .....
3. $\frac{1}{4}$ of \$31.40 = ...
4. Divide \$72.00 in a ratio of 3 : 6 .....
5. $0.62 \times 0.09 =$ .....
6. How many grams in 7.35 kilograms? .....
7. Find 25% of 380kg .....
8. Change 0.9 to a percentage .....
9. $31 + 6 \times 9 - 27 =$ .....
10. Change 6% to a decimal .....

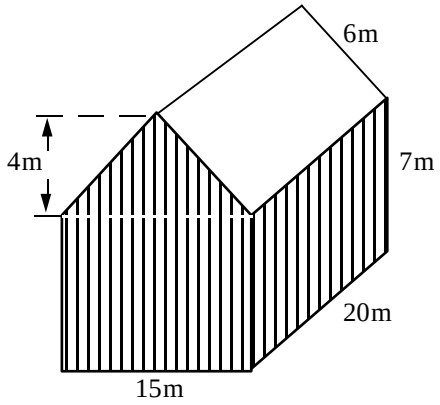
D: Magic Square

Find the missing numbers to complete this magic square.

15	17	
	21	
	25	

B: What will it Cost?

This shed is to have a coat of paint (ends. sides and roof). Calculate the



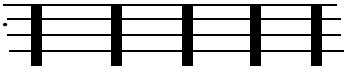
1. area of **one** side. .....
2. area of **both** sides. .....
3. area of **one** end. .....
4. area of **both** ends. .....
5. area of **one side** of the roof. .....
6. area of **all** of the roof. .....
7. What is the **total area** that is to be painted ? (both ends, both sides and all the roof) .....

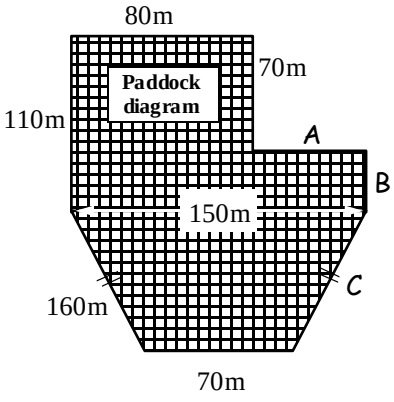
The paint used will cover 15 m^2 of the shed, with every litre used (15 m^2 per litre).

8. Calculate the number of litres needed to paint the shed. .....
9. If one litre of paint costs \$16.50, how much is it going to cost to paint the shed ? .....
10. Is \$1000 enough to pay for the paint ? .....

C: What will it Cost?

A farmer is going to fence a paddock, as shown in the diagram below. The fence is to have **4 wires** and **posts every 5 metres**.





1. Calculate the length of the sides labelled A, B and C.
   A = ..., B = ..., C = ...
2. Calculate the **perimeter** of the paddock. .....
3. How many metres of wire are needed to build the fence? (4 wires in fence) .....
4. If wire comes in 50m rolls, how many rolls of wire will be needed? .....
5. If each wire roll costs \$65.00, what will it cost for all the wire? .....
6. With posts every 5 metres, how many posts are needed for the fence to go around the paddock? .....
7. If posts cost \$6.40 each, what is the cost of the posts? .....
8. What is the total cost of the wire and posts? .....

Comments:

Please sign:
Parent / Caregiver

AWS

M1

Measurement

Homework / Assessment Worksheet

L5MM

8

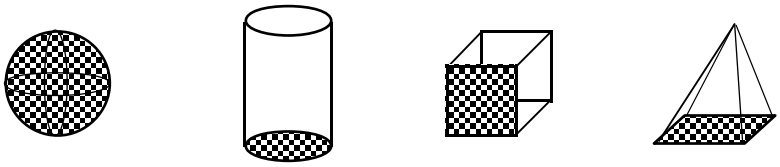
Term: **Week:** **To be completed by:**

A: 10 Quick Questions

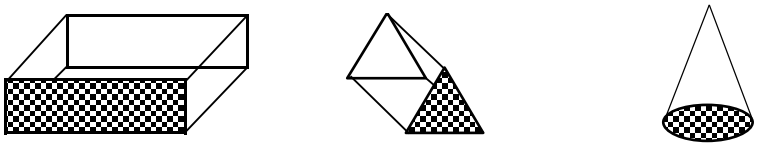
1. What is the area of a square with sides of 1.3cm? .....
2. How many kilolitres is 3750 litres? .....
3. Find 75% of 540mL .....
4. How many minutes in 5.75 hours? .....
5. $13 \times -5 =$ .....
6. $8^2 + \sqrt{900} =$ .....
7. $18.4 + 5.6 \times 2.9 =$ .....
8. $13.2 \div 1.1 =$ .....
9. Divide $96.00 in a ratio of 7 : 2 .....
10. If 2♥ + 9 = 31 , find what number the ♥ represents
    ♥ = ...

B: Name these shapes

Choose from the list below and name these shapes.



1. ..... 2. ..... 3. ..... 4. .....

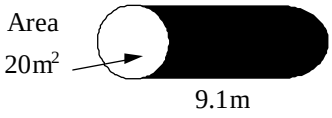


5. ..... 6. ..... 7. .....

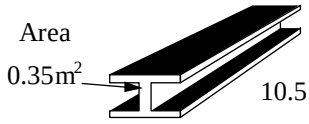
cylinder	triangular prism	rectangular prism		
cube	pyramid	sphere	cone	

C: Volume

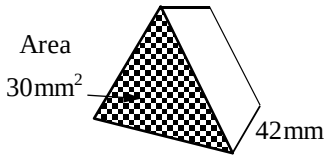
Find the volume of these shapes given the area of each cross-sectional end and the depth.



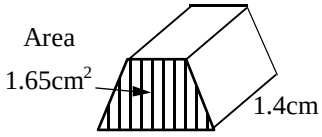
1. .....



2. .....



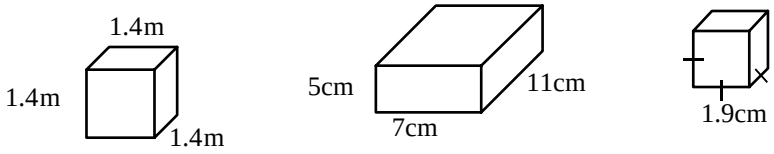
3. .....



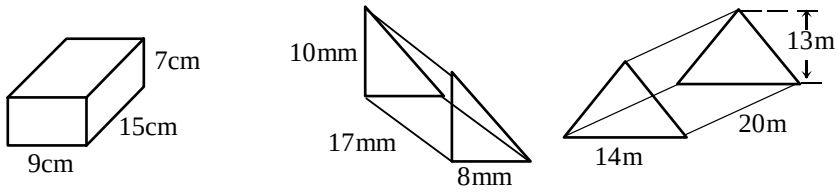
4. .....

D: If you can fill it, it has Volume

Calculate the volume of each prism shape.



1 ..... 2. ..... 3. .....



4. ..... 5. ..... 6. .....

7. Find the volume of a cube with sides of 9cm. .....
8. Find the volume of a cube with sides of 7.2m. .....
9. Find the volume of a rectangular prism with a base of 8cm, height of 7cm and a depth of 20cm. .....
10. The volume of a rectangular prism is $756m^3$. If the base is 7m and the depth is 9m, what is the height of the rectangular prism? .....
11. The volume of a rectangular prism is $588m^3$. If the base is 12m and the height is 7m, what is the depth of the rectangular prism? .....
12. The volume of a rectangular prism is $420m^3$. If the depth is 14m and the height is 5m, what is the base of the rectangular prism? .....

Comments:

Please sign:
Parent / Caregiver

AWS

Measurement

M2

Homework / Assessment Worksheet

L5MM

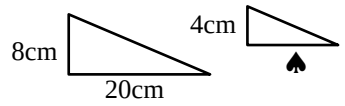
Term: **Week:** **To be completed by:**

A: 10 Quick Questions

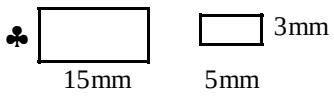
1. Convert 915 mm to cm .....
2. The perimeter of a square is 32cm, what is the area? .....
3. 72 ÷ ⁻8 = ...
4. How many weeks in five years? .....
5. Convert 0.65 to a fraction .....
6. How many seconds in 5.25 minutes? .....
7. 18m + 548cm = ...
8. How many minutes are there from 10.20 a.m. to 3.55 p.m. .....
9. 28 - 7 × ⁻4 = ...
10. 0.08 × 0.009 = ...

B: Similar figures

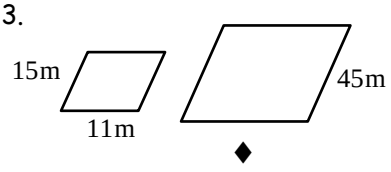
Find the missing sides. (♣♦♥♠)

1. 

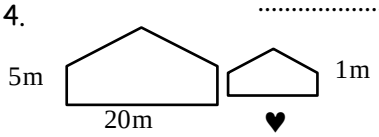
.....

2. 

.....

3. 

.....

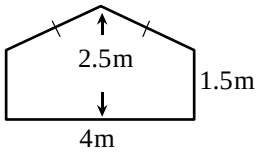
4. 

.....

5. 

.....

C: Scale Drawings

1. 

This diagram is of a shed end. Using a scale of 1 cm : 100 cm make a scale drawing of the shed, in the box provided.

2. Plans for a house have been drawn with a scale of 1 : 200. If the house is to be 16 metres across the front, how long will this be on the plan diagram?

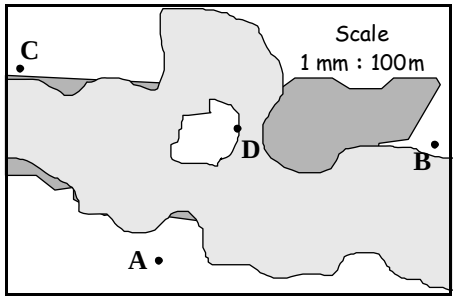
.....

3. Edward's model helicoptor is 5cm long. If it is a 1 : 250 scale model, what is the actual length of the helicopter?

.....

D: Word Problems

The diagram shows part of an orienteering map.
Measure the distance from

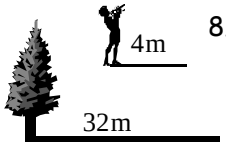


1. A to B (in mm) .....
2. B to C (in mm) .....
3. C to D (in mm) .....

Use the scale in the diagram, convert these mm distances to metres.

4. A to B .....5. B to C ..... 6. C to D .....

7. How far would they have to run, in a straight line, if the course started and finished at point A? (A to B to C to D to A) .....



8. Andrew is looking at the top of a tree, trying to work out its height. If he is 2m tall, and has a shadow length of 4m, how high is the tree, if it has a shadow of 32m? .....

9. Later in the day, the shadow of the tree had changed to be 48m. What would be the new length of Andrew's shadow? .....

10. A 40m power pole has a shadow of 100m. How long would a shadow be for a 24m high tree at the same time of the day? .....

Comments:

Please sign:
Parent / Caregiver

AWS

M3

Measurement

Homework / Assessment Worksheet

L5MM

10

Term: **Week:** **To be completed by:**

A: 10 Quick Questions

1. 862 + ♥ = 518
   Find ♥ .....
2. How many metres in 3.25 kilometres? .....
3. 11 × -9 = ...
4. How millilitres in 3.06 litres? .....
5. 5.3 × 0.9 = ...
6. How many seconds in 7.5 minutes? .....
7. $3.15 × 9 = ...
8. 0.96 ÷ 1.2 = ...
9. Name this shape  .....
10. A square has an area of 25m^2, what is the perimeter ? .....

B: What is the time ?

Write these a.m. and p.m. times as they would appear on a 24 hour digital clock.

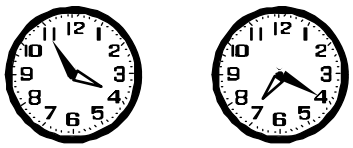
1.	5.02 a.m.	.....	6.	6.23 a.m.	.....
2.	5.37 p.m.	.....	7.	12.55 p.m.	.....
3.	11.15 p.m.	.....	8.	9.12 p.m.	.....
4.	6.29 a.m.	.....	9.	11.47 a.m.	.....
5.	10.43 a.m.	.....	10.	6.52 p.m.	.....

C: What time is it now?

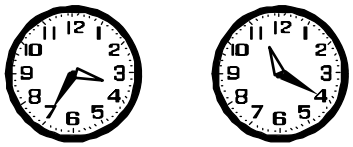
Convert these 24 hour times to a.m. or p.m.

1.	0860	.....	6.	1747	.....
2.	1743	.....	7.	2236	.....
3.	2355	.....	8.	0726	.....
4.	0827	.....	9.	2109	.....
5.	0051	.....	10.	0419	.....

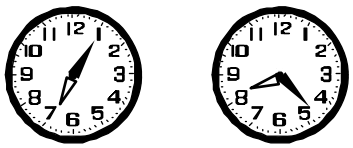
D: What is the time on these clocks?



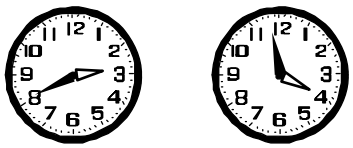
1. ..... 2. .....



3. ..... 4. .....



5. ..... 6. .....



7. ..... 8. .....

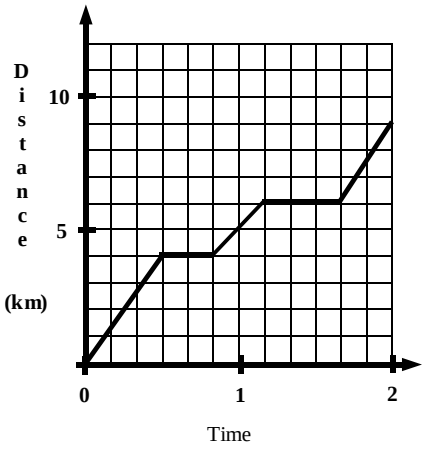
E: Word Problems

1. Mary and Jeff began a game of golf at 9.18 a.m. and it finished at 1.45 p.m. How long did the game take ?
   .....

2. The dog next door kept Rangi awake one night because of its howling. It started at 8.41 p.m. and stopped at 1.55 a.m. For how long was it howling?
   .....

3. Jason went into the movies at 8:05 p.m. He left at the end of the movie at 10:27 p.m. If the movie was 1hr 65min long, at what time did it start? .....

This is a distance-time graph for a trip along a hilly running track.



4. How far did they run before the first stop?
   .....
5. For how long did they stop?
   .....
6. During the next 20 minutes, how far did they run?
   .....
7. For how long was the second stop? .....
8. How far did they run in the last 20 minutes? .....
9. What was the average running speed (km/hr) for the entire run? .....

Comments:

Please sign:
Parent / Caregiver

AWS

Homework / Assessment Worksheet
Answers

Worksheet 1

A:

1. $5.36 2. 12 3. 9 4. -1°C 5. 0.0470 6. 570 seconds 7. $98.80 8. 90 9. 208 weeks 10. $13.75

B:

1. It means the lines are equal in length 2. The arrows mean that the arrowed lines are parallel to each other

C:

1. triangle 2. octagon 3. trapezium 4. hexagon 5. quadrilateral 6. kite 7. square 8. rhombus 9. circle 10. arrowhead 11. oval 12. quadrilateral 13. rectangle 14. parallelogram 15. pentagon

D:

1. milligram 2. litre 3. kilogram 4. centimetre 5. millimetre 6. metre 7. millilitre 8. gram 9. kilolitre 10. kilometre

E:

1. kilometres 2. kilolitres or litres 3. millilitres 4. grams 5. metres 6. kilograms 7. litres 8. metres 9. grams 10. millimetres 11. milligrams 12. millimetres 13. centimetres

Worksheet 2

A:

1. 6 2. 63cm^2 3. -31 4. 42 months 5. 0.0405 6. 225 seconds 7. $113.40 8. 8 9. $4.60 10. 240km

B:

1. 1000m 2. 1L 3. 1000mL 4. 1000L 5. 1km 6. 1cm 7. 1000mm 8. 1kg 9. 1000kg 10. 1g

C:

1. 80mm 2. 7km 3. 1700g 4. 500cm 5. 32cm 6. 5.9kL 7. 73cm 8. 6.2m 9. 5000kg 10. 0.061m 11. 5400mm 12. 0.916g 13. 6900kg 14. 0.385L 15. 4600mL 16. 1850mg 17. 3.48km 18. 860g 19. 579mm 20. 41cm 21. 6790mg 22. 0.904L 23. 740g 24. 877mm 25. 3.17km

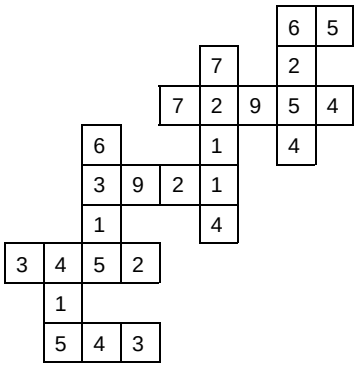
D:

1. 233cm 2. 596cm 3. 50cm 4. 563cm 5. 358cm 6. 10.6kg 7. 7.861kg 8. 0.996kg 9. 5.36kg 10. 1.405kg

E:

1. $10.80 2. $13.05 3. $65.00 4. 63c 5. $13.95 6. $3.05 7. $1.40 8. 1.8c 9. $11.75 / kg was the better buy

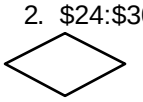
F:



Worksheet 3

A:

1. 7 2. $24:$30 3. 4.347 4. 8105m 5. 20 6. 8.5 minutes 7. $55.50 8. 1300 9. kilogram 10.



B:

1. 36cm 2. 48cm 3. 23cm 4. 40mm 5. 32m 6. 38mm 7. 35.8mm 8. 40cm 9. 26.5m 10. 40m

C:

1. 720m 2. 1800m 3. 5 laps 4. 241m 5. 240cm 6. 13.6m

D:

1. 70mm 2. 76cm 3. 58.1m 4. 10.7cm

Worksheet 4

A:

1. 148 2. $45:$36 3. 8.347 4. 6.25km 5. 47.4 6. 52cm 7. 14 8. -18 9. 0.3496 10. -34

B:

1. 23 squares 2. 12 squares 3. 26 squares 4. 18 squares

C:

1. 56.25cm^2 2. 76mm^2 3. 32.5cm^2 4. 58.5m^2 5. 157.5cm^2 6. 90m^2

D:

1. 507cm^2 2. 602cm^2

E:

1. 1.7m^2 2. 6.8m^2 3. 425mL 4. 1 tin, $14.35

F:

12	5	16
15	11	7
6	17	10

13	20	9
10	14	18
19	8	15

Worksheet 5

A:

1. 6.69 2. 27 3. 5300g 4. 180^o 5. 0.0135 6. 69.15 7. ¾ 8. 11 9. 117 weeks 10. 60cm

B:

1. 150cm^2 2. 247m^2 3. 88.48mm^2 4. 140mm^2

C:

1. 684 – 169 = 515mm^2 2. 7.7 – 2.43 = 5.27cm^2 3. 105 – 40 = 65cm^2

D:

1. 42.5m^2 2. 9.4m^2 3. 742.5m^2 4. 99662.5m^2

Worksheet 6

A:

1. 135cm^2 2. 8.4cm 3. 6.1 × 10^4 4. 166 minutes 5. 385 6. 360^o 7. $96.25 8. 65 9. 16
10. 81

B:

1. centre 2. radius 3. diameter 4. circumference 5. sector 6. segment 7. arc 8. chord

C:

1. C = 74.4cm, A = 446.4cm^2 2. C = 9.3m, A = 6.975m^2 3. C = 40.3cm, A = 130.975cm^2
4. C = 62cm, A = 310cm^2

D:

1. 968.75mm^2 2. 148.8cm^2 3. 2.718m^2 4. 900 - 706.5 = 193.5cm^2 5. 1808.64 - 452.16 = 1356.48cm^2
6. Earth has a diameter of 12756km, a radius of 6378km, C = 40053.84km

Worksheet 7

A:

1. -7 2. 90 3. $7.85 4. $24:$48 5. 0.0558 6. 7350g 7. 95kg 8. 90% 9. 58 10. 0.06

B:

1. 140m^2 2. 280m^2 3. 105 + 30 = 135m^2 4. 270m^2 5. 120m^2 6. 240m^2 7. 790m^2 8. 52.7·L
9. $869.55· 10. Yes

C:

1. A = 70m, B = 40m, C = 160m 2. 760m 3. 3040m 4. 60.8 rolls of wire
5. $3952 6. 152 posts 7. $972.80 8. $4924.80

D:

15	17	31
37	21	5
11	25	27

Worksheet 8

A:

1. $1.69cm^2$ 2. 3.750kL 3. 405mL 4. 345 minutes 5. -65 6. 94 7. 34.64 8. 12
9. \$74.66:\$21.33 10. 11

B:

1. sphere 2. cylinder 3. cube 4. pyramid 5. rectangular prism 6. triangular prism 7. cone

C:

1. $182m^3$ 2. $3.675m^3$ 3. $1260mm^3$ 4. $2.31cm^3$

D:

1. $2.744m^3$ 2. $385cm^3$ 3. $6.859cm^3$ 4. $945cm^3$ 5. $1360mm^3$ 6. $1820m^3$ 7. $729cm^3$
8. $373.248m^3$ 9. $1120cm^3$ 10. 12m 11. 7m 12. 6m

Worksheet 9

A:

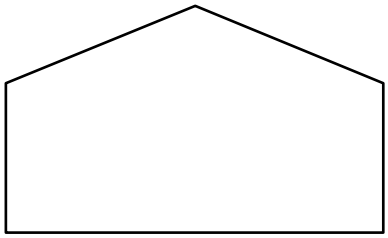
1. 91.5cm 2. $64cm^2$ 3. -9 4. 260 weeks 5. $^{65}/_{100} = {}^{13}/_{20}$ 6. 315 seconds 7. 23.48m or 2348cm
8. 335 minutes 9. 56 10. 0.00072

B:

1. 10cm 2. 9mm 3. 33m 4. 4m 5. 22.5m

C:

1. see diagram at right 2. 8cm 3. 1250cm or 12.5m



D:

1. 40mm 2. 55mm 3. 30mm 4. 4000m 5. 5500m
6. 3000m 7. 14500m or 14.5km 8. 16m 9. 6m 10. 60m

Worksheet 10

A:

1. ¯344 2. 3250m 3. ¯99 4. 3060mL 5. 4.77 6. 450 seconds 7. \$28.35 8. 0.8
9. (isosceles) trapezium 10. 20m

B:

1. 0502 2. 1737 3. 2315 4. 0629 5. 1043 6. 0623 7. 1255 8. 2112 9. 1147
10. 1852

C:

1. 8:50 a.m. 2. 5:43 p.m. 3. 11:55 p.m. 4. 8:27 a.m. 5. 12:51 a.m. 6. 5:47 p.m. 7. 10:36 p.m.
8. 7:26 a.m. 9. 9:09 p.m. 10. 4:19 a.m.

D:

1. 5 to 4 or 0355 or 1555 2. 20 past 7 or 0720 or 1920 3. 25 to 4 or 0335 or 1535 4. 20 past 11 or 1120 or 2320 5. 5 past 7 or 0705 or 1905 6. 23 past 8 or 0823 or 2023 7. 19 to 3 or 0241 or 1441
8. 2 to 4 or 0358 or 1558

E:

1. 267 minutes or 4hrs 27 mins 2. 314 minutes or 5hrs 14 mins 3. 8:22 p.m. 4. 4km 5. 20 minutes
6. 2km 7. 30 minutes 8. 3km 9. 4.5 km/hr

Tracking Sheet: 'In-class' Activity Sheets

Worksheet	Objectives	Comments														
23	M3															
22	Revision															
21	Revision															
20	Revision															
19	M1 / M2															
18	M1 / M2															
17	M1 / M2															
16	M1 / M2															
15	M1 / M2															
14	M1 / M2															
13	M1 / M2															
12	M1															
11	M1															
10	M1 / M2															
9	M1															
8	M1															
7	M1															
6	Revision															
5	Revision															
4	Revision															
3	Revision															
2	Revision															
1	Revision															
Name	Name															

Mastermath

Tracking Sheet: Homework / Assessment Worksheets

Measurement

Worksheet	Objectives	Name														Comments
10	M3															
9	M2															
8	M1															
7	M2															
6	M1 / M2															
5	M1 / M2															
4	M1 / M2															
3	M1 / M2															
2	Revision															
1	Revision															