Year 9 Mathematics
Practice Exam #1

Time: 2 hours

Sections

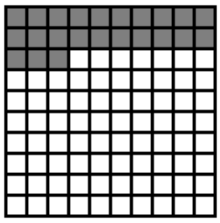
Topic	Page	Result
Number Base skills: percentages; fractions; decimals; negatives factors and multiples Higher level: multiple step problems, percentage change	2	
Algebra and Graphs Base skills: simplifying; expanding; factorising; one step solving plotting points; reading graphs; using rules for patterns Higher level: multiple step solving; writing equations from contexts equations of graphs; finding rules for patterns	4	
Measurement Base skills: perimeters and areas of triangles; quadrilaterals and circles; units and unit conversions Higher level: shapes composed of two or more simple shapes; rates; volumes; time calculations	8	
Angles Base skills: measuring angles; terminology; point, triangle and parallel line geometry Higher level: interior angles of polygons, multiple step problems in triangles and parallel lines; proofs	11	
Overall Grade		

It is expected that working is shown for all questions.

Number

For marker's use only		
Achieved	**Merit**	**Excellence**
☐	☐	☐

QUESTION ONE



If the large square is a whole, give the shaded portion of it as:

a) a fraction _____

b) a decimal _____

c) a percentage _____

QUESTION TWO

a) Write these from smallest to largest.

–6, –6.5, –5, 8.15, 8.2, 8.103

_____

b) Write as decimals to two decimal places:

i) 5.4389 = _____

ii) 0.49773 = _____

b) Write as decimals to 3 decimal places:

i) 4.8% = _____

ii) $\frac{13}{7}$ = _____

QUESTION THREE

a) Convert to simplest improper fractions:

i) $\frac{3}{5} \times 5\frac{5}{6}$ = _____

ii) 2.4 = _____

b) Convert to mixed numbers:

i) $\frac{17}{6}$ = _____

ii) $\frac{21}{5} \div 3\frac{1}{2}$ = _____

QUESTION FOUR

a) What is 17% of 150?

_____

b) If there are 7 new cars and 12 old cars, what percentage is new?

_____

c) If a $40 item is reduced in price by 8%, what will it cost?

_____

d) A boy weighs 58 kg in Year 9 and 65 kg in Year 10. What is his increase as a percentage?

_____

QUESTION FIVE

The Dead Sea is 423 m below sea level. If a balloon takes off from the Dead Sea and rises 500 m straight up, what will its new height be?

_____

QUESTION SIX

Bob's Cars start the year with 24 cars for sale.

During January they sell three-eighths of those cars.

At the start of February they get an extra ten more cars to sell.

They sell 56% of the total during February.

a) How many cars are sold during January?

_____

b) How many cars do they have at the end?

_____

_____

c) What is the percentage change in the number of cars (from start to end)?

_____

QUESTION SEVEN

Timmy wants to save up for a phone that costs $350.

He earns $55 a week, but he knows that he will only save 40% of that.

How many weeks will it take him to save up for the phone?

_____

_____

_____

QUESTION EIGHT

Bob got a pay rise of 10%, after which his salary is $60,500. What was it before the rise?

_____

_____

QUESTION NINE

Emily starts a business selling bracelets.

She thinks that the most she can sell them for is $49 each.

The on-line seller she uses will take 5% of her sale price in commission.

$500 of materials will make fifteen bracelets.

She can make three an hour, but it also takes 30 minutes each to pack and send (the buyer pays the postage)..

What is the most she can earn per hour?

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Algebra and Graphs

For marker's use only		
Achieved	**Merit**	**Excellence**
☐	☐	☐

QUESTION ONE

Calculate the following expressions if $p = 5$, $q = 4$ and $r = -2$

a) $2pq$ = _____

b) $q + r$ = _____

c) r^2 = _____

d) $(r - q)^3$ = _____

_____

QUESTION TWO

Solve these equations (find the value of the unknown number). Show your working.

a) $x + 15 = 2$

x = _____

b) $2.4x = 18$

x = _____

c) $5n - 2 = 24$

_____

_____

n = _____

d) $2 = 17 + 5x$

_____

_____

_____

x = _____

e) $8x + 11 = 5x + 19$

_____

_____

_____

x = _____

QUESTION THREE

A quarter of a number is seven less than half that same number.

a) Write that situation as an equation, with n as the number.

_____

b) Solve the equation in part a) to work out the number.

_____

_____

QUESTION FOUR

a) Bill had \$25, but after buying seven pies he was left with \$8.20.

Write an equation to represent this situation in terms of the price of a pie, p.

_____

_____

b) Solve your equation for part a), showing your working.

_____

_____

QUESTION FIVE

Simplify the following expressions:

a) $5d - 3d + 4d =$ _____

b) $k \times 4 \times h =$ _____

c) $2x + 9x^2 + 8x - 5x^2 =$ _____

_____

d) $p \times p \times p =$ _____

e) $20x + 8 - 3 \times 5x =$ _____

_____

QUESTION SIX

If n represents a number, write an expression for:

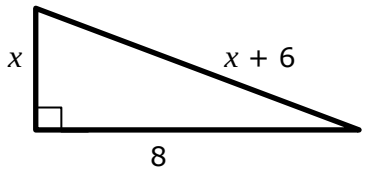
a) Four more than that number:

_____

b) That number times itself after being multiplied by five:

_____

QUESTION SEVEN



A triangle has the dimensions shown.

Write and simplify expressions for:

a) The perimeter of the triangle

_____

_____

b) The area of the triangle (A = ½bh).

_____

_____

QUESTION EIGHT

Expand these sets of brackets. Simplify if need be:

a) $4(x + 3)$

_____

b) $2k(k - 4)$

_____

c) $k(k + 2) - 4(k + 3)$

_____

_____

QUESTION NINE

Fully factorise these expressions (write using brackets).

a) $6x + 18$

_____

b) $8 - 16k$

_____

c) $2p + p^2$

_____

d) $3x^2 + 15xy$

_____

QUESTION TEN

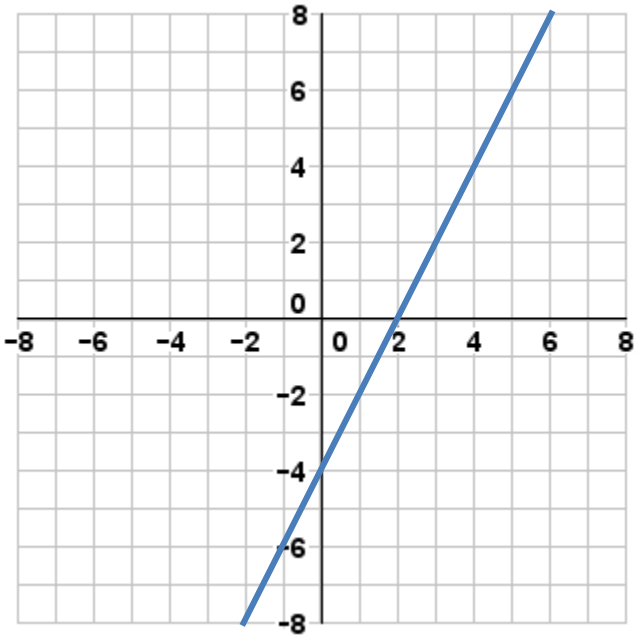
Write the next term in each of the following sequences:

a) 3, 7, 10, 13, _____

b) 9, 6, 3, 0, _____

c) 3, 6, 12, 24, _____

QUESTION ELEVEN



Give the line's:

a) y intercept _____

b) gradient _____

c) equation _____

QUESTION TWELVE

A pattern is made of grey and white hexagons.

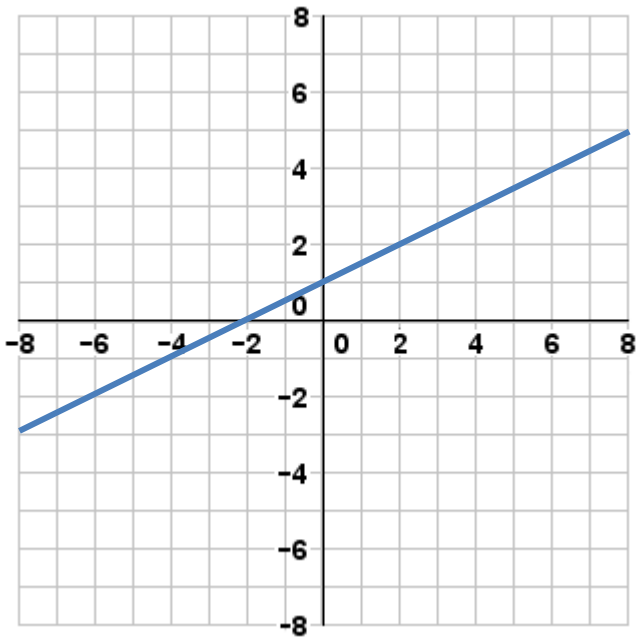
For the pattern above

Number of Grey (G)	Number of White (W)
1	0
2	2
3	4
4	6

Write a rule linking G and W.

W = _____

QUESTION THIRTEEN



a) Give the equation of the line shown above.

_____

b) On the graph draw the line of equation

$y = -2x + 3$

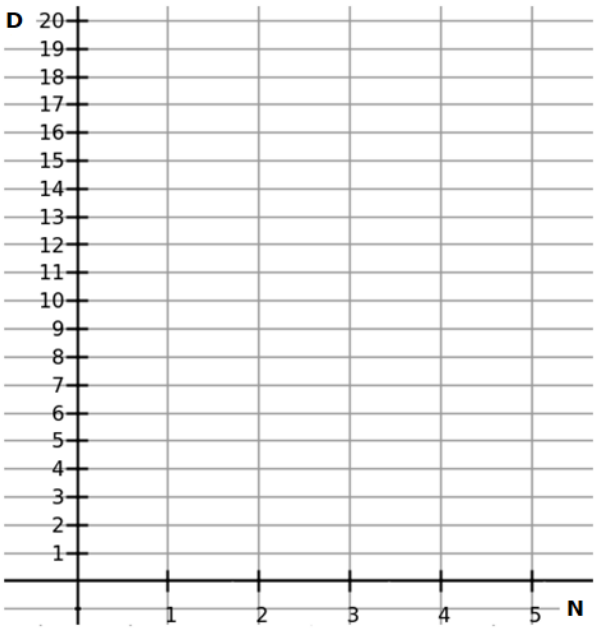
QUESTION FOURTEEN

A pattern is made from a series of dots. The first three shapes in the pattern are shown.

a) Complete the table to show how many dots are used in each shape.

Shape Number (N)	Dots (D)
1	7
2	
3	
4	
5	

b) Plot the values from the table as points on the graph below



c) Write a rule linking N and D

_____

d) Use that rule to find what shape number would have 157 dots.

_____

_____

Measurement

For marker's use only		
Achieved	**Merit**	**Excellence**
☐	☐	☐

QUESTION ONE

Complete the following conversions:

a) 380 m = _____ km

b) 7.5 g = _____ mg

c) 4.8 L = _____ cm^3

d) 300 seconds = _____ minutes

e) 2.2 hours = _____ minutes

QUESTION TWO

A door is the dimensions shown.

a) What is its perimeter?

_____

b) What is its area?

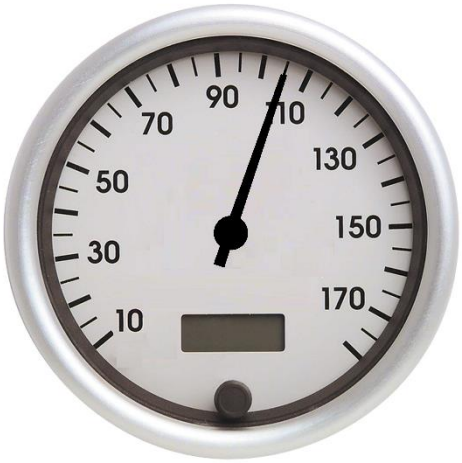
_____

c) If a tin of paint covers 3.5 m^2, will it cover both sides of the door?

_____

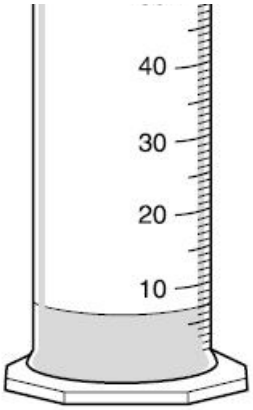
_____

QUESTION THREE



a) This device measures the speed of a car.
The reading is:

_____ (number) _____ (unit)



b) A few spoonsful of water fill this cylinder.
The reading is:

_____ (number) _____ (unit)

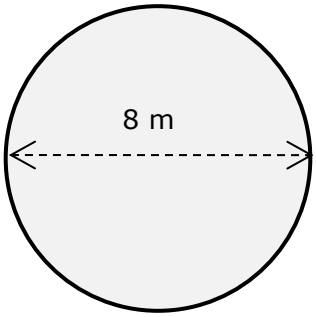
QUESTION FOUR

The formulas $A = \pi r^2$ and $C = \pi d$ may help

Patricia is putting a round pool into her back yard. She wants a round fence around it, and a deck between the pool and the fence.

a) The pool has an 8 m diameter.

It is 1.4 m deep.



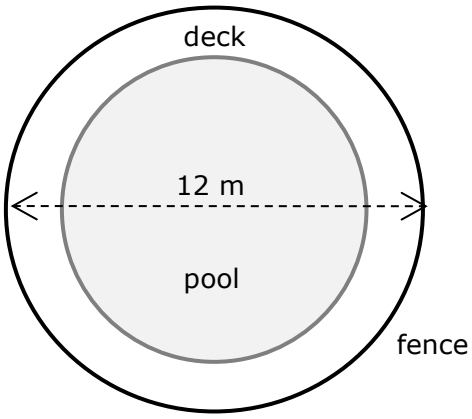
i) The pool has a cover over it.

What is the area of the cover?

ii) What is the volume of the pool?

iii) If a hose can fill the pool at a rate of 25 litres a minute, how many hours will it take to fill the pool?

b) The fence will be two m away from the pool all the way around.



i) How long will the fence be?

ii) If the space between the pool and the fence is deck, what area of decking will there be?

QUESTION FIVE

a) Ezekial is going to watch a Champions League football match.

He knows that it is two halves of 45 minutes, a half-time of 15 minutes and there will be about 5 minutes of extra time.

i) How long is the match in hours? (give as a fraction or decimal, not hours and minutes)

_____

_____

ii) If it starts at 2:30 p.m., when will it finish?

_____

_____

b) Peter is flying to Brisbane from Auckland.

He knows the flight time is 3 hours and twenty minutes.

His plane takes off on Thursday at 21:45 Auckland time.

i) When does he arrive, in 24 hour clock, Auckland time?

_____

_____

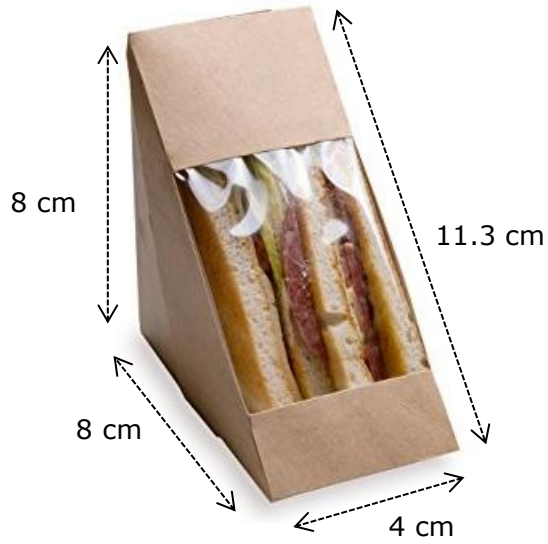
_____

ii) Brisbane time is two hours before NZ. When does he arrive in normal Brisbane time?

_____

_____

QUESTION SIX



Celine's Café packs their sandwiches in triangular prism packs, as shown above.

a) They want to put labels on the triangular end sections.

What is the area of one triangle side?

_____

_____

b) What is the volume of each pack?

_____

_____

c) The sandwich packs are packaged into cartons that are cubes, 24 cm along each side.

Each sandwich pack weighs 80 grams.

How many kg is a carton of sandwiches?

_____

_____

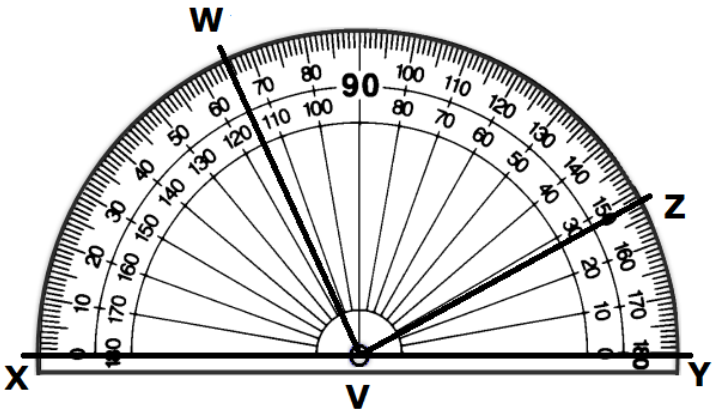
_____

_____

Geometry

For marker's use only		
Achieved	**Merit**	**Excellence**
☐	☐	☐

QUESTION ONE



Give the **size** in degrees and whether they are **acute**, **obtuse** or **reflex** for the following angles:

∠ XVW = _____ Type _____

∠ XVZ = _____ Type _____

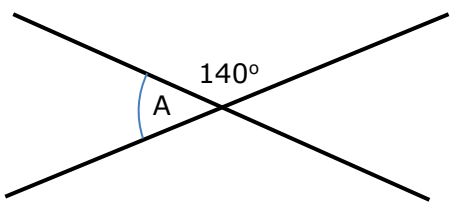
∠ YVZ = _____ Type _____

∠ WVZ = _____ Type _____

QUESTION TWO

Give the unknown angles in these situations, along with the reason or reasons used to calculate them.

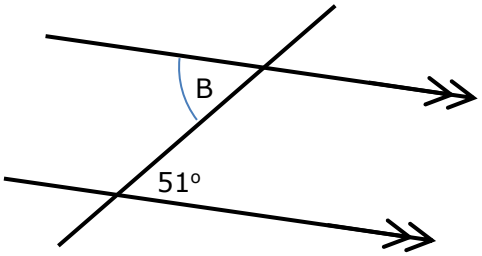
a) Two lines cross



A = _____

Reason: _____

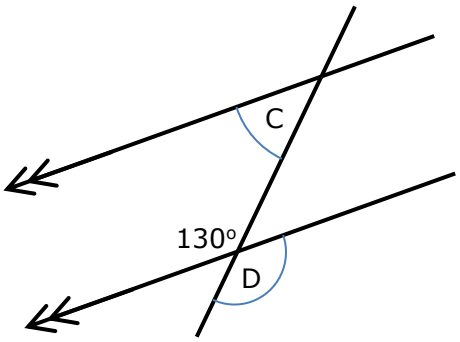
b) Two parallel lines are crossed by another line



B = _____

Reason: _____

c) Two parallel lines are crossed by another line



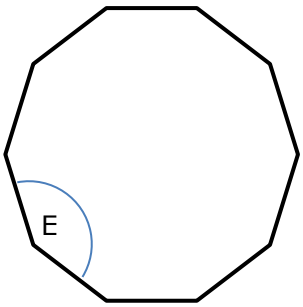
C = _____

Reason: _____

D = _____

Reason: _____

d) An interior angle of a regular decagon.



E = _____

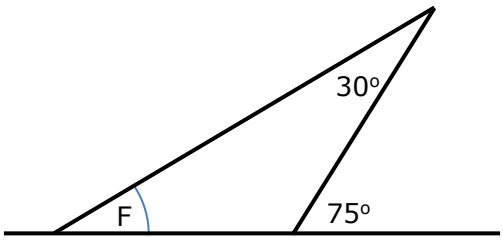
Reasons: _____

_____

_____

_____

e) A triangle is raised above a straight line.



F = _____

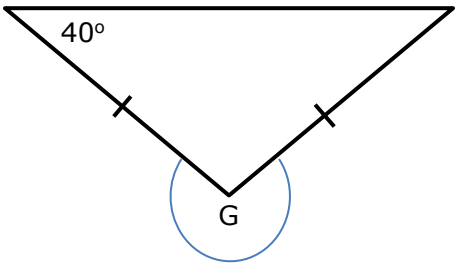
Reasons: _____

_____

_____

_____

f) An isosceles triangle.



G = _____

Reasons: _____

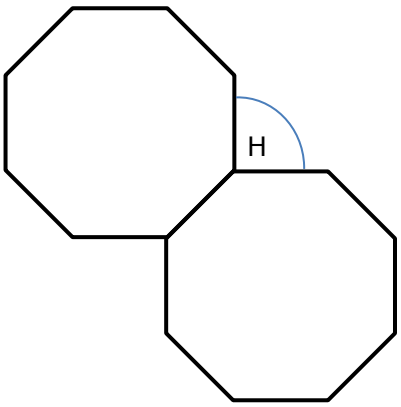
_____

_____

QUESTION THREE

Calculate the angles marked with letters, giving full reasons:

a) Two regular octagons share an edge



H = _____

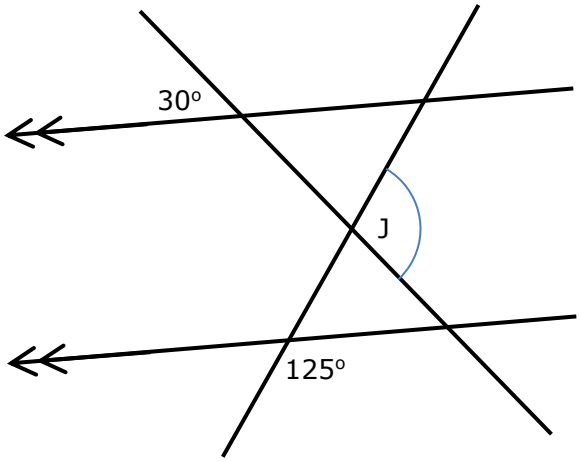
Reasons: _____

_____

_____

_____

b) A pair of parallel lines has two transverse lines.



J = _____

Reasons: _____

_____

_____

_____

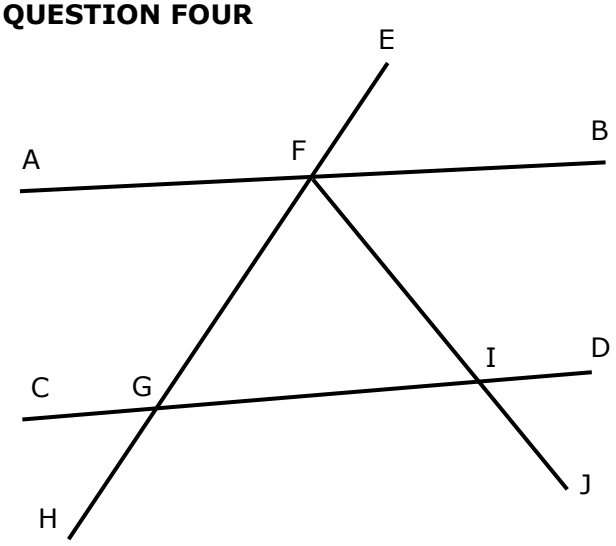
_____

_____

_____

_____

QUESTION FOUR



∠AFE = 130°, ∠GFI = 70° and ∠DIJ = 60°.

Show that the lines AB and CD are parallel.

_____

_____

_____

_____

_____

_____

_____

_____