



Mission Heights Junior College
Year 10 Examination 2017
Subject: Mathematics

Name: _____

Whanau: Forest

Instructions:

Time allowed for this examination is 2 hours.

You should attempt all the required questions in this examination. You are allowed to use a calculator.

Start writing when you are instructed to do so. You have 5 minutes of reading time before you start writing.

Use the space provided after each question to write all your answers. If you need extra writing sheets then ask your teacher.

Check that this booklet has pages 1 to 20 in the correct order.

YOU MUST HAND THIS BOOKLET TO THE TEACHER AT THE END OF THE TEST.

Working Towards	Achieved	Merit	Excellence

WAME

Student ability/understanding.....

Section	Working Towards	Achieved	Merit	Excellence
Number	You have attempted to solve problems involving integers, decimals and fractions	You have solved problems involving integers, decimals and fractions	You have solved number problems involving few steps	You have Solve number problems in context involving several steps.
Alegbra	You have attempted to Carry out simple algebraic manipulations and solve simple equations	You have Carried out simple algebraic manipulations and solve simple equations.	You have carried out more complex algebra manipulations and solve linear equations.	You have solved algebra problems involving manipulation.
Geometric reasoning and Trigonometry	You have : attempted to use geometric properties and trigonometry to solve problems	You have: used geometric properties and trigonometry to solve problems	You have: used geometric properties and trigonometry to solve problems and give brief reasons	You have: used Geometric properties and trigonometry to solve problems in context, providing reasons.
Examination Conditions	You have completed this assessment, however you did not adhere to Examination conditions.	You have completed this assessment, however you did not adhere to Examination conditions.	You have completed this assessment, adhering to Examination conditions.	You have completed this assessment, adhering to Examination conditions.

Number

Food Carnival

QUESTION ONE

- (a) $\frac{3}{7} + \frac{2}{9} =$
- (b) $\frac{1}{9}$ of 300 =
- (c) $-6 + 20 \div -4 =$
- (d) 10% of 150 =



QUESTION TWO

One of the stalls at the show ran competitions to win a jar of lollies. The entry fee was \$1.50 and people had to guess the number of lollies in the jar.

- (a) 2150 people paid to guess the number of lollies in the jar. How much entry fee money was paid?

- (b) The 800 lollies in the jar were coloured blue, green, yellow, orange and red. $\frac{1}{5}$ of the lollies were red. How many lollies were red?

- (c) 244 of the lollies were blue. What percentage of the lollies were blue?

- (d) 17% of the lollies were green. How many lollies were green?

(e) 260 lollies were either yellow or orange. The ratio of orange to yellow lollies is 2:3. How many orange lollies were in the jar?

QUESTION THREE

The Haunted House attraction at the carnival was very popular.



(a) The number of people entering the house in 2016 was 20% more than the 3450 people who entered the house in 2015. How many people entered the house in 2016?

(b) The ticket price for the Haunted House was \$4. 50 including GST. Calculate the GST exclusive price.

QUESTION FOUR

There is a competition for the biggest Pumpkin at the Carnival.



The weights of the five largest pumpkins are below:

5.22kg, 5.3kg, 5.67kg, 5.09 kg, 4.71 kg, 4.17kg

(a) Order the weights of these pumpkins from smallest to largest.

(b) Add the weights together and round your answer to:

(i) One decimal place: _____

(ii) Two significant figures: _____

QUESTION FIVE

(a) The total amount of money spent at the carnival in 2016 was \$ 1, 754, 000. Write this amount in standard form.

(b) $\frac{2}{5}$ of the money raised was donated to different charities.

Calculate the amount of money given to charities.

(c) \$20 000 of the charity money was donated to the Salvation Army. What percentage of the charity money was given to the Salvation Army?

(d) In 2014 the amount of money spent at the carnival was $\$1.27 \times 10^5$ and in 2015 amount of money spent at the carnival was $\$ 9.09 \times 10^4$. Calculate the total amount of money spent at the carnival in 2014, 2015 and 2016.

Algebra

QUESTION ONE

Simplify the following expressions

(a) $5w + 3y + 2y + 6w =$ _____

(b) $5y^2 - 6z + 7y^2 - 4z =$ _____

(c) $m \times m \times m \times m =$ _____

(d) $3w^5 \times 6w^4 =$ _____

(e) $(p^4)^5 =$ _____

(f) $\frac{36x^7}{9x^5} =$ _____

(g) $\frac{6y^9 5y^6}{3y^7} =$ _____

QUESTION TWO

Expand and simplify the following expressions:

(a) $6(2x - 5) =$ _____

(b) $3(2w - 6) - 7(w + 5) =$

(c) $(x + 4)(x - 2) =$

QUESTION THREE

Fully factorise the following expressions:

(a) $xy + xw =$ _____

(b) $6y - 36 =$ _____

(c) $24x^5y^6 - 32x^3y^2 =$ _____

(d) $x^2 + 7x + 10 =$ _____

(e) $2x^2 - 8x - 24 =$ _____

QUESTION FOUR

Solve the following equations

(a) $w - 3 = 10$

_____ $w =$ _____

(b) $3p + 5 = 11$

_____ $p =$ _____

(c) $\frac{x}{10} + 5 = 12$

_____ $x =$ _____

(d) $4p - 7 = 2(p + 3)$

_____ $p =$ _____

(e) $(x + 9)(x - 2) = 0$

_____ x = _____

(f) $x^2 + 11x + 30 = 0$

_____ x = _____

(g) $x^2 - 36 = 0$

_____ x = _____

QUESTION FIVE

The formula for the volume of a cone is:

$V = \frac{1}{3} \pi r^2 h$ v = volume r = radius

(a) Calculate the volume of a cone with a radius of 5cm and height 7cm

(b) Rearrange the formula to make r the subject.

QUESTION SIX

An insurance salesman is paid \$500 a week plus \$50 commission for every insurance policy sold.

(a) Write an equation to represent the salesman's weekly pay. Use P = pay and C = commission.

Use your equation to answer the following two questions:

(b) How much will the salesman be paid if he sells 7 policies next week?

(c) The salesman was paid \$1 050 last week. How many policies did he sell?

(d) Last month the salesman sold two more policies than the previous month. The product of the two months sales was 440. This information is represented by the equation below:

$$x(x + 2) = 440$$

Solve the equation and determine the amount of policies sold for each of last two months.

QUESTION SEVEN

Give the next two terms in each of these patterns:

(a) 1, 7, 13, __, __

(b) 1, 4, 9, __, __

(c) 4, 11, 32, 95, __, __

(d) n , $(n + 2)$, $(n + 4)$, _____, _____

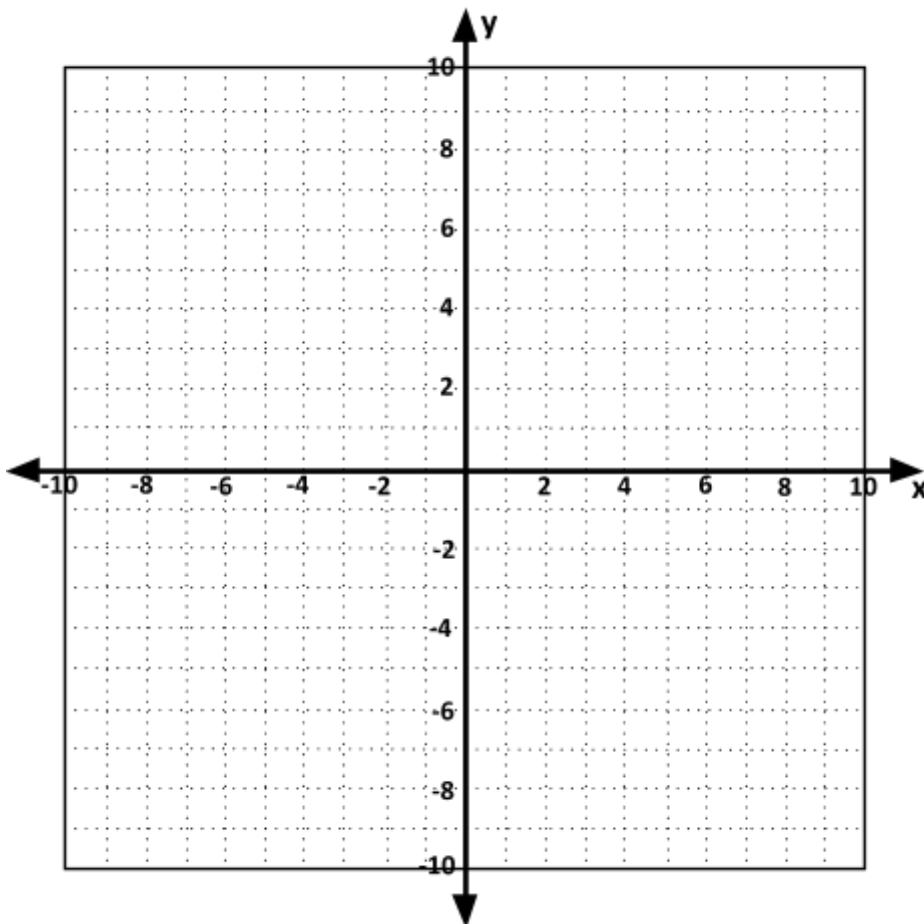
QUESTION EIGHT

Plot the following straight lines on the axes below. Remember to label each line.

(a) $y = 3x + 1$

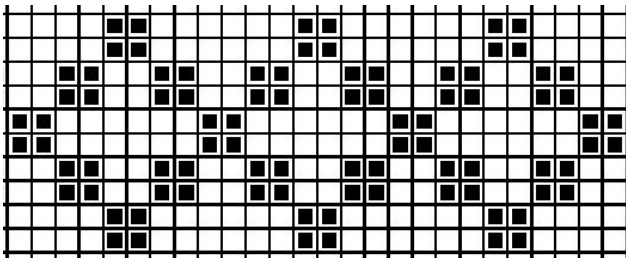
(b) $y = -\frac{1}{3}x + 1$

(c) $y = x^2 - 3$



QUESTION NINE

Below is a photograph of a simple cross stitch pattern of black diamonds.



Complete the table below

(a)

Number of Diamonds (D)	Number of black squares
1	32
2	60
3	88
4	
5	
6	
7	

(b) Write an equation linking the number of blacks squares needed to the number of diamonds.

B = _____

(c) If 20 diamonds were made, how many black squares were cross stitched?

(d) If the points in the table above were plotted and joined to make a straight line on a co-ordinate axes.

Describe what type of graph will it make.

Give 2 features of the graph

QUESTION NINE:

Pam was 30 years old when her daughter was 4 years old.

Now, some years later, her daughter is half Pam’s age.

How old is her daughter now?

You must show at least one equation that is used in solving this problem.

QUESTION TEN:

A bar of chocolate and 2 ice creams cost \$5.20

2 bars of chocolate and 1 ice cream cost \$3.80

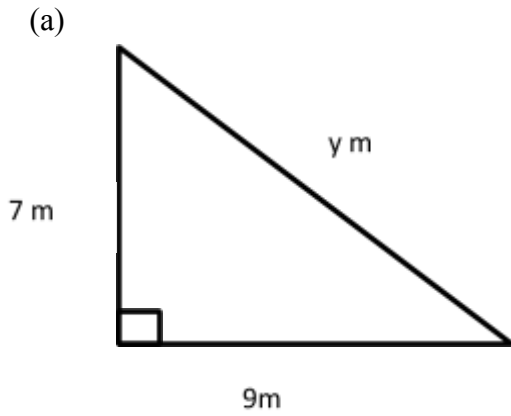
What is the cost of 2 bars of chocolate and 2 ice creams?

You must show at least one equation that is used in solving this problem.

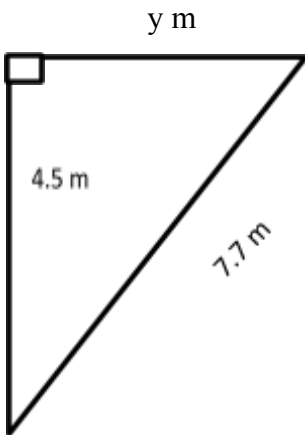
Trigonometry

QUESTION ONE

Calculate the size of side y .



(b)



QUESTION TWO

Calculate the values of x to 1 decimal place.

(a) $8^2 + 7^2 = x^2$

(b) $x^2 + 3.3^2 = 10.9^2$

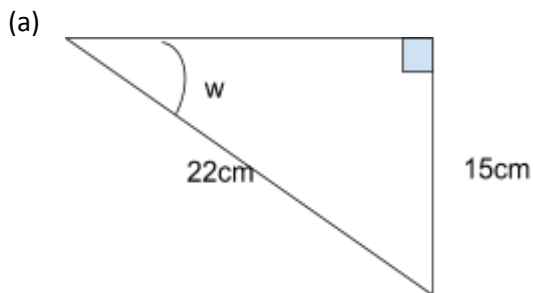
(c) $x = 10\sin 40$

(d) $\cos 40 = \frac{x}{9}$

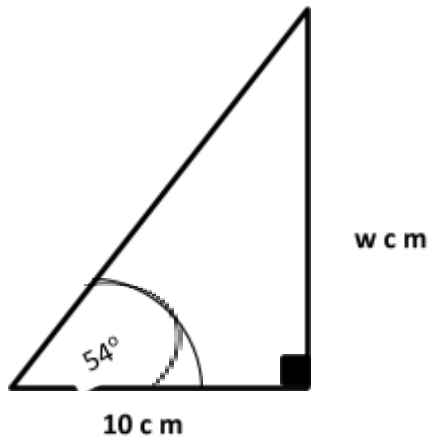
(e) $\sin 30 = \frac{7}{x}$

QUESTION THREE

Calculate the size of w



(b)

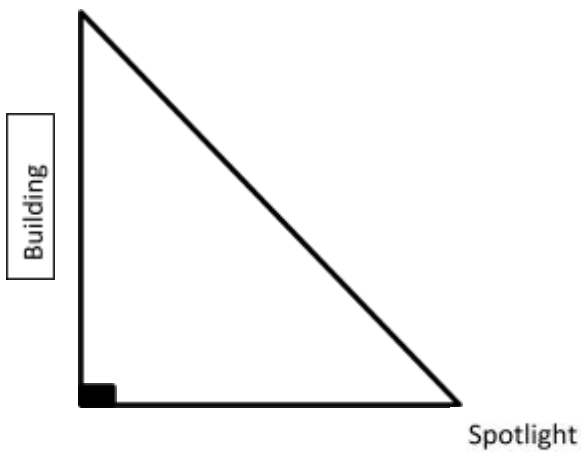


QUESTION FOUR

The city council is installing coloured spotlights lights to light up an old building at night.

The building is 15m high and the lights will be placed 10m away from the base of the building.

Calculate the angle of elevation the lights need to be set at to shine at the top of the building.



QUESTION FIVE

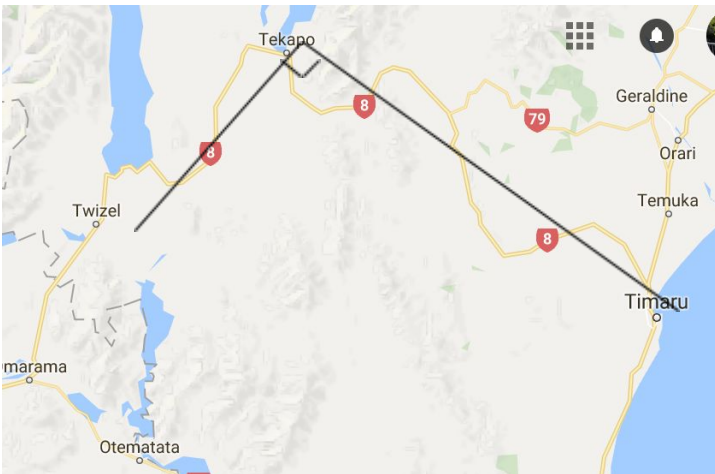
A new water pipe needs to be installed across the Hockey turf.

Calculate the length of the pipe.



QUESTION SIX

The rescue helicopter is travelling from its base near Tekapo to a farm near Twizel then on to Timaru Hospital



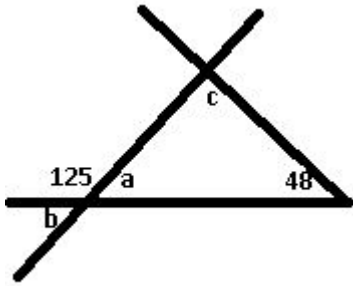
The distance from Twizel to Tekapo is 57 km. the distance from Tekapo to timaru is 106 km.

(a) Calculate the distance the helicopter will fly from Twizel to timaru.

Geometry

QUESTION ONE

Calculate the size of each marked angle. Give a geometric reason for each answer.



$a =$ _____

Reason _____

$b =$ _____

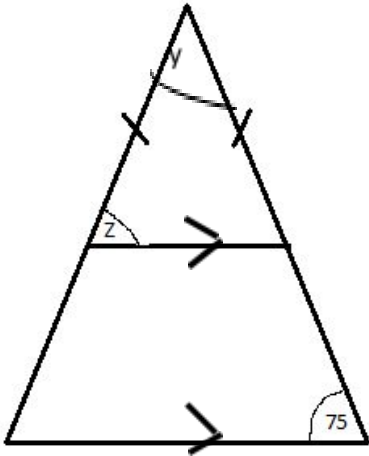
Reason _____

$c =$ _____

Reason _____

QUESTION TWO

Calculate the size of each marked angle. Give a geometric reason for each answer.



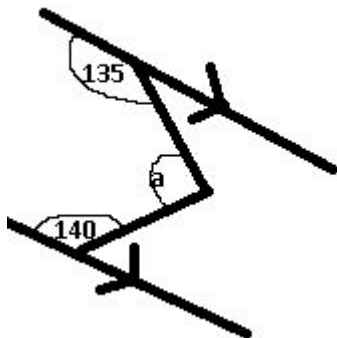
Z= _____

Reason _____

Y= _____

Reason _____

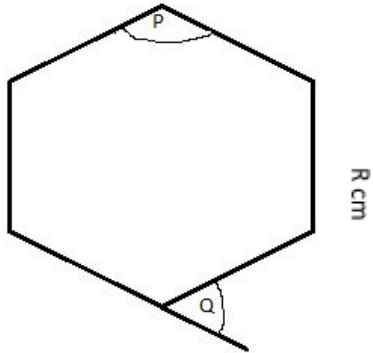
QUESTION THREE



a = _____

Reason _____

QUESTION FOUR



(a) What is the name of this regular polygon?

(b) Give the sizes of P and Q

$P =$ _____

Reason _____

$Q =$ _____

Reason _____