Mission Heights Junior College
Year 10 Examination 2017
Subject: Mathematics

Name:_____

Whanau: Water

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 solved number problems in context involving several steps
Alegbra	You have attempted to carry out simple algebraic manipulations and solved simple equations	You have carried out simple algebraic manipulations and solved simple equations	You have carried out more complex algebra manipulations and solved linear equations	You have solved algebraic 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 with reasoning	You have used geometric properties and trigonometry to solve problems in context with justification
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	You have completed this assessment adhering to Examination conditions

Number

MHJC International Food Festival

_____

QUESTION ONE

(a) $\frac{3}{7} + \frac{2}{9} =$

(b) $\frac{1}{9}$ of 300 =

(c) -6 + 20 ÷ -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) 2,150 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

MHJC food fest has become very popular.

(a) The number of visitors in 2017 was 20% more than the 3,450 people who visited our school in 2016. How many people visited our school food fest in 2017?

_____

_____

_____

(b) The cost for pizza was $4. 50 including GST. Calculate the GST exclusive price.

_____

_____

QUESTION FOUR

There was a competition for the biggest Pumpkin at the Food Festival.

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 Food Festival in 2017 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 2015 the amount of money spent at the Food Festival was $1.27 x 10^5 and in 2017 amount of money spent at the Food Festival was $ 9.09 x 10^4. Calculate the total amount of money spent at the Food Festival in 2015 and 2017.

_____

_____

_____

_____

QUESTION SIX

At Ormiston senior college Sally decided to work for PAK'nSAVE during her summer break. She was paid $15.75 an hour.

For every 5 hours worked an unpaid half an hour meal break must be taken.

From Sally's income, 18% tax and 2% KiwiSaver is deducted.

PAK'nSAVE is open seven days a week, from 10am until 10pm.

Sally decided to work for 6 weeks starting 1st December until the 12th January.

Sally decided to take a day off on Christmas day.

Sally is working to save money for University. She needs to save $6 500.

Will Sally be able to save enough money for University?

You must show all calculations and state what you are calculating at each step.

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 that 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), _____, _____

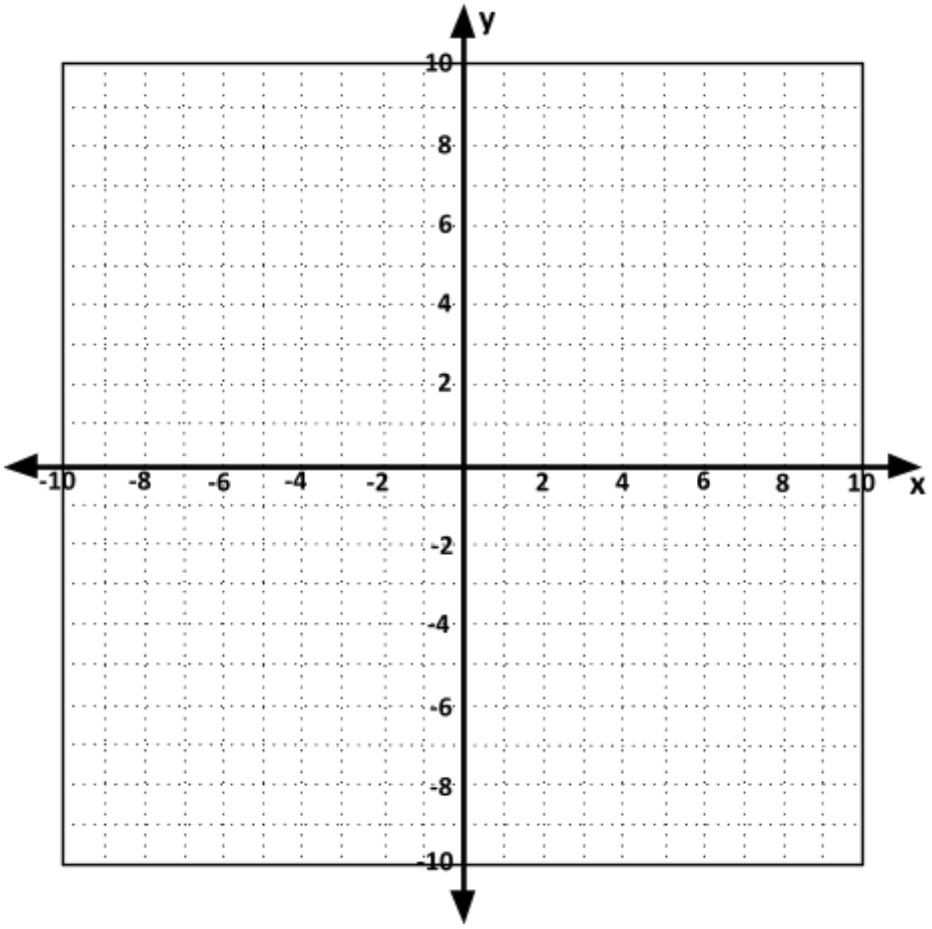
QUESTION EIGHT

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

(a) $y = 3x + 1$

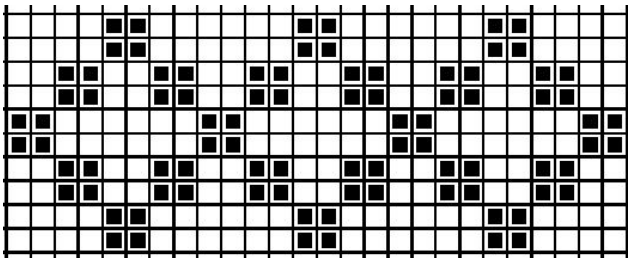
(b) $y = -\frac{1}{3}x + 1$

(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?

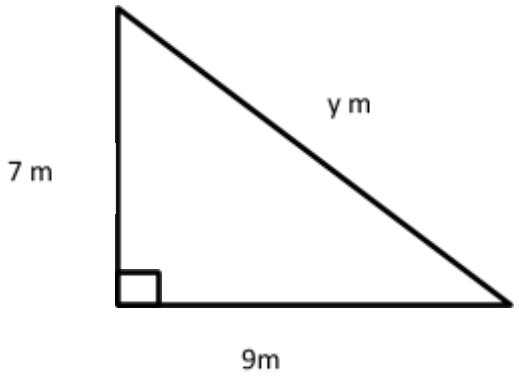
You must show at least one equation that is used in solving this problem.

Trigonometry

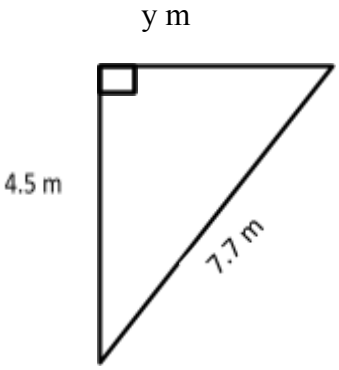
QUESTION ONE

Calculate the size of side y.

(a)



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

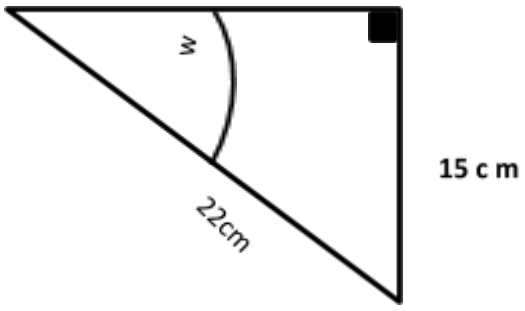
_____

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

_____

QUESTION THREE

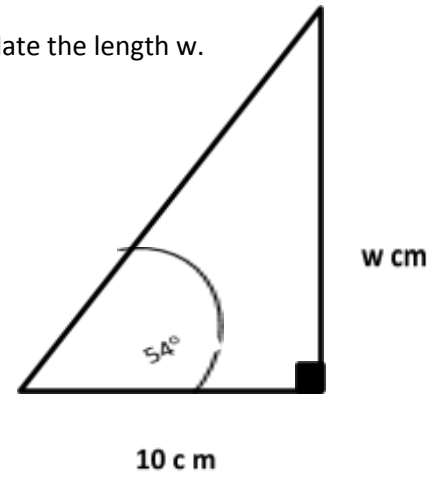
a) Calculate the angle w.



_____

_____

(b) Calculate the length w.



_____

_____

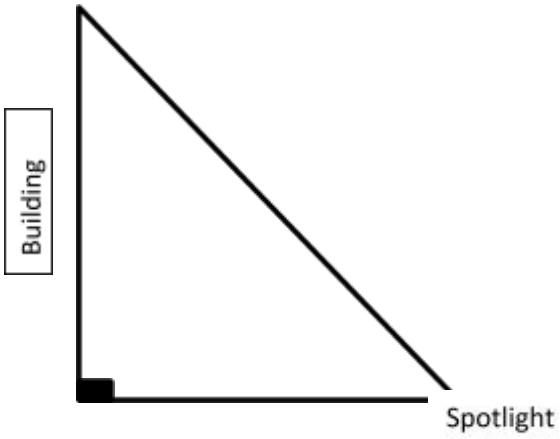
_____

QUESTION FOUR

The school is installing spotlights to light up the entrance of the school 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 upto the top of the building.



_____

_____

_____

_____

QUESTION FIVE

A new water pipe needs to be installed across the basketball courts.

Calculate the length of the pipe.

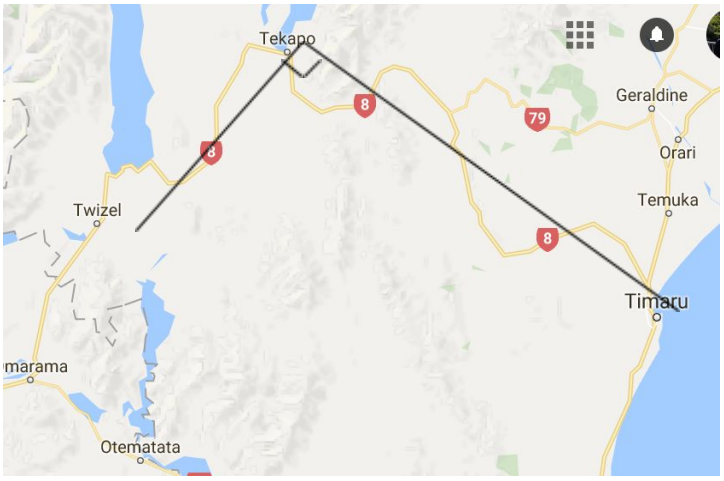
_____

_____

_____

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.

_____

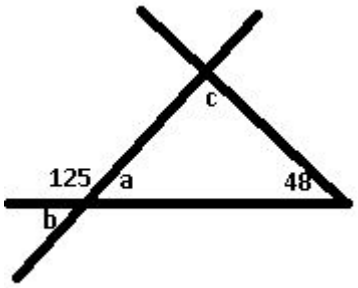
_____

_____

Geometry

QUESTION ONE

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



a = _____

Reason_____

_____

b= _____

Reason_____

_____

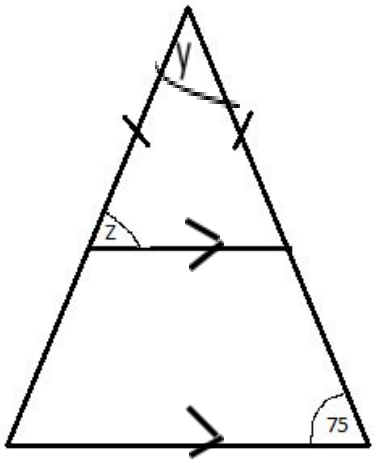
c = _____

Reason_____

_____

QUESTION TWO

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



Z= _____

Reason _____

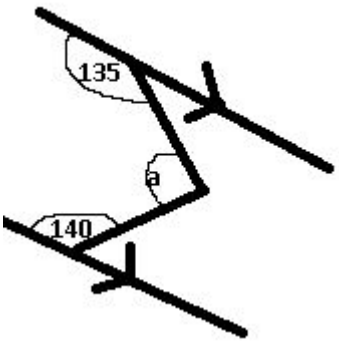
_____

y= _____

Reason _____

_____

QUESTION THREE



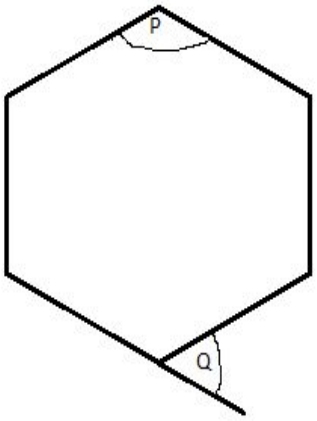
a = _____

Reason _____

_____

_____

QUESTION FOUR



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

_____

(b) Give the sizes of P and Q

P = _____

Reason _____

Q = _____

Reason _____