Mission Heights Junior College
Year 10 Mathematics CAT Practice
Time: 1 hour

Name: _____**Class/Whanau**: _____

Instructions:

You should attempt all the 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 with **the working shown very clearly**. If you need extra writing sheets then ask your teacher. Round your answers to 2 dp where applicable. Use only black or blue pen to write the paper. Use pencil only to draw the graph and diagrams.

Check that this booklet has pages 1-16 in the correct order.

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

Working Towards	AT	ABOVE	BEYOND

Sections

Section	WT	AT	ABOVE(AB)	BEYOND(TAAB)
A: Algebra and graphs	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 complex algebraic manipulations and solved linear equations and graphs	You have applied algebraic skills to solve problems
B: Pythagoras and Trigonometry	You have attempted to use trigonometry to solve mathematical problems	You have used trigonometry to solve mathematical problems	You have used trigonometry to solve mathematical problems with reasoning	You have used 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, 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.

Section A: Algebra and Graphs

QUESTION ONE

Give the next two terms in each of these patterns:

(a) 3, 6, 9, ___, ___ [AT]

(b) 1, 8, 27, ___, ___ [AT]

(c) 6, 11, 16, 21, ___, ___ [AT]

(d) (n-3), (n-2), (n-1), _____, _____ [AB]

QUESTION TWO

Andrew works at New World and stacks rolls of toilet paper.

Here is the pattern he uses.

(a) Complete the table below [AB]

Number of Pattern (P)	Number of toilet paper rolls (R)
1	1
2	3
3	6
4	10
5	
6	
7	

(b) Write an equation that links the pattern number(P) to the number of toilet paper rolls

R = _____ [TAAB]

_____

_____

_____

(c) If Andrew made pattern number 25, how many rolls of toilet paper would he use?

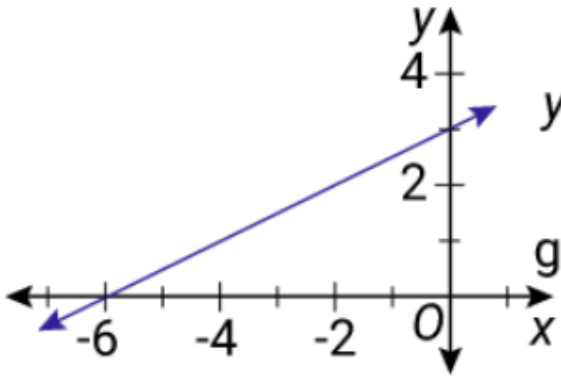
_____ [AB]

_____

_____

QUESTION THREE

Consider the graph.



y-int = ☐

gradient = ☐/☐

[AT]

Equation = ☐

[AB]

QUESTION FOUR

Simplify the following expressions

(a) $6y + 2z + 5y + 6z =$

[AT]

(b) $7x^2 - 5w + 9x^2 - 4w =$

[AT]

(c) $2f^3 \times 8f^5 =$

[AT]

(d) $n \times n \times n \times n =$

[AT]

(e) $\frac{42x^5}{7x^2}$ =

[AT]

(f) $(3k^2)^7$ = [AB]

(g) $\frac{-12p^6 4p^7}{8p^5}$ = [AB]

(h) $\frac{2y}{5} + \frac{4y}{7}$ = [AB]

QUESTION FIVE

Expand and simplify the following expressions:

(a) $4(3x + 2)$= [AT]

(b) $2(3x – 4) – 3(x + 6)$=

[AT]

(c) $(x + 5)(x – 3) =$

[AB]

QUESTION SIX

Factorise the following expressions:

(a) $8z – 48$ [AT]

(b) $12x^5y^4 – 30x^3y^6$

[AB]

(c) $x^2 + 10x + 25$

[AB]

(d) $2y^2 + 4y – 30$ (TAAB)

QUESTION SEVEN

Solve the following equations

(a) $p + 4 = 14$ [AT]

(b) $4x + 5 = 17$ [AT]

(c) $\frac{w}{9} - 4 = 6$ [AB]

(d) $5x + 6 = 2x - 10$ [AB]

(e) $3w + 8 = 2(w - 4)$ [AB]

(f) $(x-6)(x+3) = 0$ [AB]

(g) $x^2 + 7x + 12 = 0$ [AB]

(h) $\frac{3y}{5} + \frac{2y}{7} = 2$ [TAAB]

QUESTION EIGHT

Mabel is a real estate salesperson. When she sells a house she is paid a $10 000 fee plus a commission of 2.5% of the sale price of the house.

(a) Write an equation to represent what Mabel will earn if she sells a house.

Use E = Earnings and S = Sale price of the house. [AB]

Use your equation to answer the following two questions:

(b) Calculate what Mabel will earn if she sells a house for $450 000. [AT]

(c) Mabel was paid $23 750 for the last house she sold. What was the sale price of the house? [AB]

(d) Mabel's friend Ricki works for another real estate company.
When he sells a house he is paid a $6 000 fee plus a commission of 3% of the sale price of the house. At what price do Mabel and Ricki need to sell a house for to get the same amount of earnings?
Use algebra to solve this question.

[TAAB]

Section B: Trigonometry

QUESTION ONE

Calculate the values of x to 1 decimal place.

(a) $3^2 + 8^2 = x^2$ (AT)

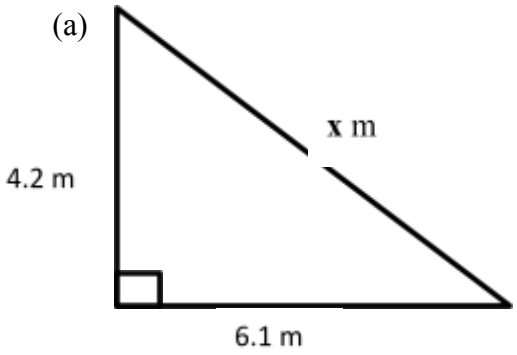
(b) $x^2 + 2.3^2 = 5.4^2$ (AT)

(c) $x = 3.5\sin 50^\circ$ (AT)

QUESTION TWO

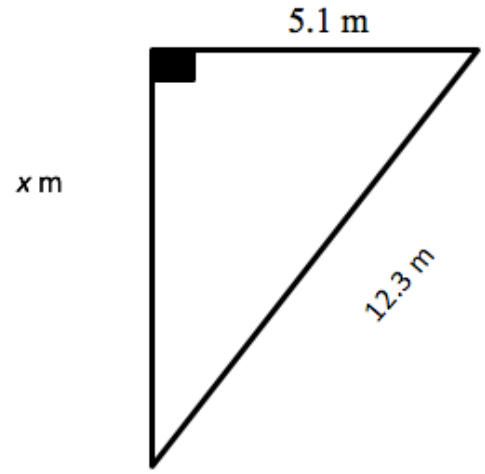
Calculate the size of side x to 1 decimal place.

(a)



(AT)

(b)



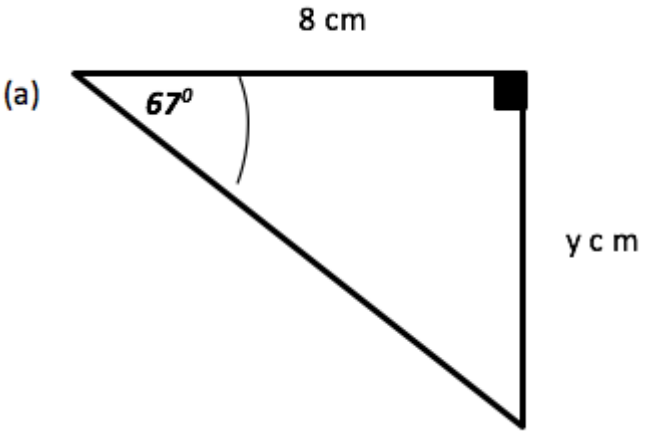
_____ (AT)

_____

QUESTION THREE

Calculate the size of y to 1 decimal place

(a)

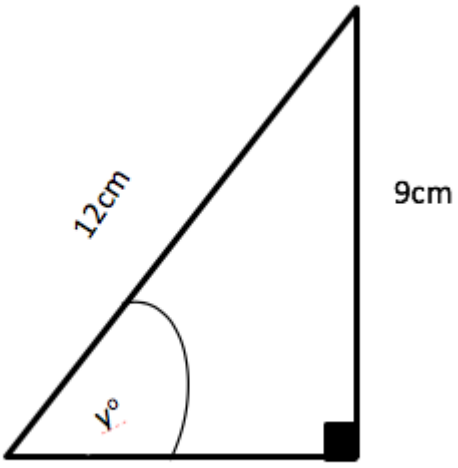


_____ (AA)

_____

_____

(b)



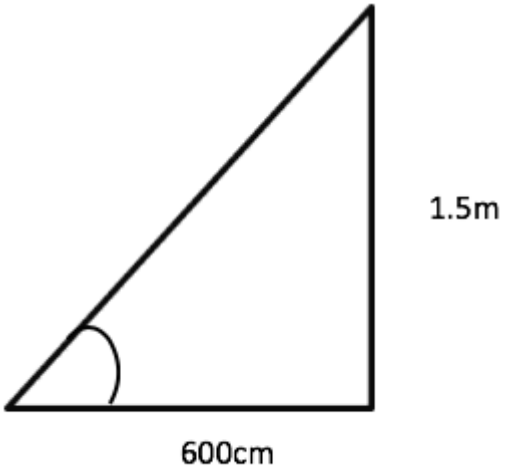
_____ (AA)

_____

_____

QUESTION FOUR

Mr Faafoi is going to construct a handrail on the steps up to the front door. The height of the steps is 1.5m and the depth 600cm.



(a) Calculate the minimum length the handrail should be. (AA)

_____

_____

_____

_____

_____

(b) Calculate the angle of elevation of the stairs. (AA)

QUESTION FIVE

A search and Rescue boat is on a training trip. The Boat starts at the Piha Surf Life club and travels 25km, then turns west and travels 13 Km, and finally turns back and travels back to the Piha Surf Life Club. The arrows show the path of the boat.

(a) Calculate the angle the boat needs to turn to travel back to the club house. (AA)

(b) Calculate the bearing the boat needs to travel back to the boathouse. (TAAB)

_____

_____

_____

Working space