



Mission Heights Junior College
Subject: Year 9 Mathematics CAT 2021
Time: 1 hour

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

Instructions:

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 with **the working steps 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 a pencil only to draw the graph and diagrams.

Check that this booklet has pages 1-14 in the correct order including a planning sheet.

OVERALL GRADE:

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

Working Towards	AT	ABOVE	BEYOND

Grading Feedback

Section	Working Towards	AT	ABOVE(AB)	BEYOND(TAAB)
A - 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.
B -Algebra and patterns	You have attempted to describe simple arithmetic or geometric patterns and plot and interpret simple graphs	You have described simple arithmetic or geometric patterns and plot and interpret simple graphs	You have found terms and rules for patterns and interpret linear graphs	You have solved algebra problems using graphs and manipulation
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: Number Show ALL working.

Many of the questions in this section are about the Solomon family.

Question One

(a) Calculate the following:

(i) $-5 \times 7 =$

_____ [AT]

(ii) $9 - -8 =$

_____ [AT]

(iii) $6 + 40 \div 4 =$

_____ [AT]

(iv) $(-6)^2 =$

_____ [AT]

(v) $-3(6 + 4) - 11(3 - 1) =$

_____ [AB]

(vi) $52 + 7(11 - 5)^2 + 2 =$

_____ [AB]

(vii) Order the following numbers from smallest to largest:

0.33, 0.03, 0.32, 0.34, 0.034, 0.032

_____ [AT]

(b) Mr Solomon went for an early morning run. When he left the house the temperature outside was -2 degrees. When he finished his run the sun had come up and the temperature had increased by 5 degrees.

What was the temperature when Mr Solomon finished his run?

_____ [AT]

QUESTION TWO

(a) $\frac{3}{7} + \frac{1}{6} =$

_____ [AT]

(b) $\frac{4}{9} \times \frac{2}{5}$

= _____ [AT]

(c) $650 \div \frac{2}{5}$

= _____ [AT]

(d) $\frac{2}{5} + \frac{3}{7} \times \frac{1}{8} =$

_____ [AB]

QUESTION THREE

(a) The Solomon children eat a lot of bread. The number of slices of bread eaten each day last week is as follows:

Monday = 12

Tuesday = 14

Wednesday = 16

Thursday = 18

Friday = 10

Saturday = 20

Sunday = 17

How many slices of bread were eaten last week?

_____ [AT]

(b) The family used 21 litres of milk last week. Approximately how many litres of milk were used each day?

[AT]

(c) Mrs Solomon is a Doctor. She works at the hospital at night time four days a week from 11pm until 8 am. Dr Solomon is paid \$120.95 an hour. Calculate her weekly pay.

[AB]

(d) Each night Mrs Solomon spends $\frac{2}{3}$ of her time working in the emergency department. Using the information in the previous question, calculate the amount of hours Dr Solomon works in the emergency department each night.

[AB]

(e) One night at the hospital Dr Solomon treated 63 patients. The ratio of the patients in the emergency department and not in the emergency department was 4:3. How many patients did Dr Solomon treat in the emergency department?

[B]

(f) Mr Solomon delivers loaves of bread to local supermarkets. He has two different sized trucks. The smaller truck can deliver 320 loaves and the larger truck can deliver 480 loaves.

Tomorrow, Mr Solomon needs to deliver 4 160 loaves of bread. Determine the number of trips he needs to make to deliver all of the bread, so that each truck used is fully loaded. State the number of small trucks and larger trucks that would be used.

[AB]

QUESTION FOUR

Mr Solomon puts 4.5 % of his weekly pay into Kiwi Saver.

(a) Write 4.5% as a decimal.

[AT]

(b) If Mr Solomon is paid \$1 400 last week, how much money each did he put into to Kiwi Saver?

[AB]

(c) During 2020 Mr Solomon started saving for a holiday. He saved \$150 a week. In total he saved a total of \$2 400. For how many weeks did he save money for the trip?

[AB]

(d) The Solomon family have also been saving to buy a new house. They have \$32 000 to invest into a savings account. The savings account earns 1.5% compound interest per year.

If the family invests the money for 3 years, how much will the investment be worth at the end of 3 years?

[B]

(e) The Solomon's have found a new house they wish to buy. The house is worth \$1 200 000.

- The family have a \$32 000 saved
- They can sell the house they are living in now for \$650 000.
- When they sell the house for \$650 000 they will have to pay 10% commission to the real estate agent. (Commission is the cost of selling a house)
- They can get a \$400 000 loan (Mortgage) from the bank
- Mr Solomon has 3 old delivery trucks he could sell for \$14 000 each
- Mrs Solomon's parents will give the family an amount of money equal to $\frac{1}{8}$ of the cost of the house.

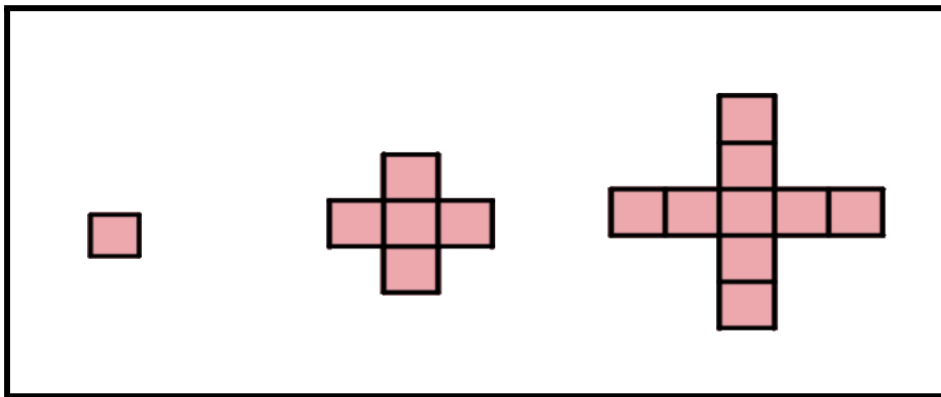
Can the Solomon's afford to buy the new house? (You must show your working and clearly communicate what you are calculating at each step)

Section B: Algebra and Patterns Show ALL working.

QUESTION ONE

Question One

(a) Below is a pattern, draw the next part of the pattern



Draw the next part here

[AT]



(B) Complete the table

[AT]

Pattern number (n)	Number of squares (S)
1	1
2	5
3	9

4	
5	

(c) Complete the equation for the pattern:

$$S =$$

_____ [AT]

Use n = pattern number and s = number of squares

(d) Use the formula you wrote to calculate the number of squares in pattern number 100.

_____ [AT]

(e) What number pattern would have 57 squares?

_____ [AB]

QUESTION TWO

List the next three terms for the following sequences.

(a) 1, 6, 11, 16, _____, _____, _____ [AT]

(b) 1, 3, 7, 15, _____, _____, _____ [AT]

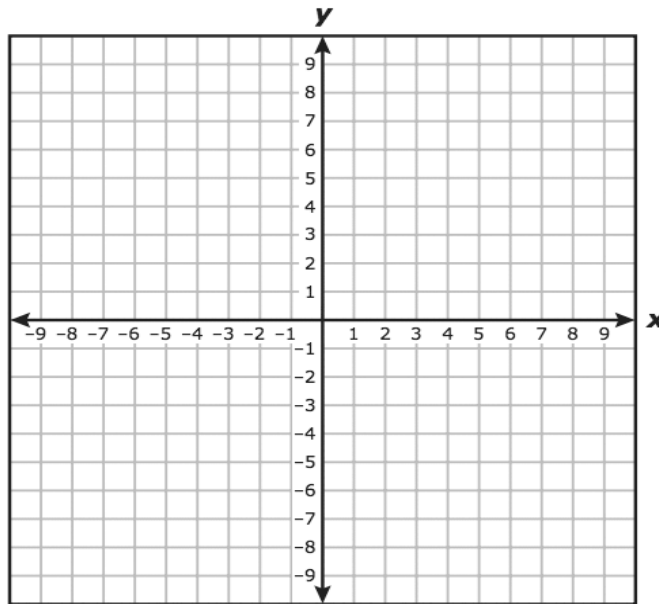
(c)

(d) 1, 1, 2, 3, 5, 8, _____, _____, _____ [AT]

QUESTION THREE

(a) On the axes below plot the following points then using a ruler join the points up.

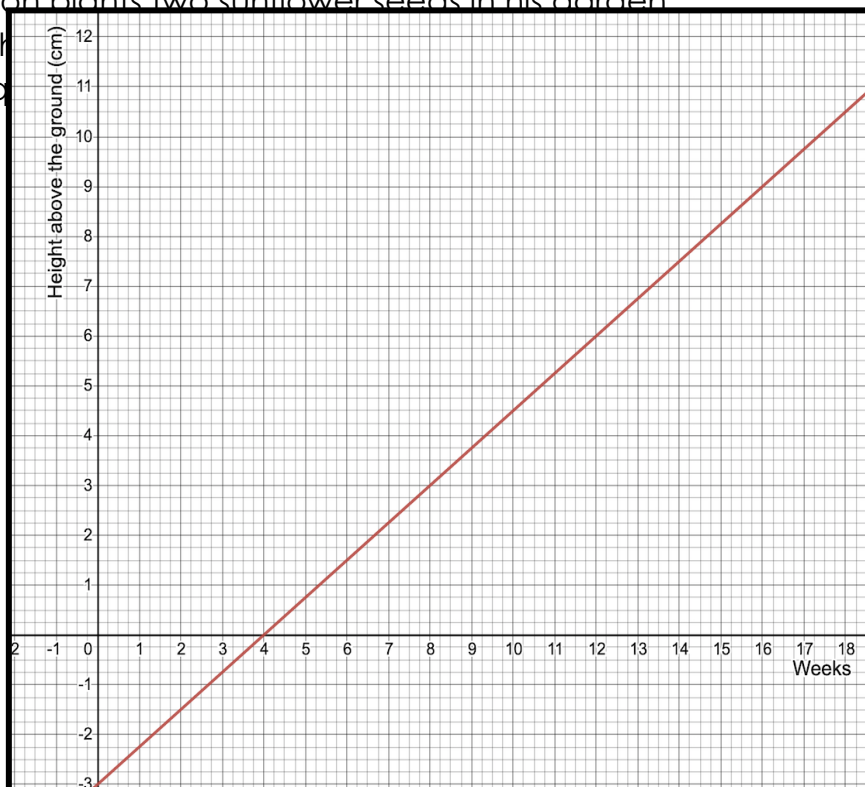
$(-3, -5)$ $(-3, 5)$ $(0, 0)$ $(3, 5)$ $(3, -5)$, $(0, -1)$ $(-3, -5)$ then join the points up in order to make a shape. [B]



QUESTION FOUR

Mr Solomon plants two sunflower seeds in his garden.

Below is the graph showing the height of the sunflowers given in centimeters over time.



ification

(a) How high was the sunflower at 10 weeks?

_____ [AB]

(b) Why does the line hit the y axis at -3?

_____ [B]

(c) Write an equation for the line

$y =$ _____ [B]

(d) The second sunflower seed grew at a different rate. The equation for the growth of sunflower two is

$$y = 1.2x - 3$$

Draw this line on the sunflower graph given above. The table is given to you for you to calculate the coordinates of the equation.

x					
y					

Working area for the table above

_____ [B]

(e) Describe any similarities and differences of the growth of sunflower one and sunflower 2. Refer to features in the graphs in your answer.

[B]

QUESTION FIVE

(a) If $a = 2$, $b = -4$ calculate the value of $3a + 2b$

[AT]

(b) (b) The formula for the volume of a cylinder is:

$$V = \pi r^2 h$$

($V = \text{Volume}$, $r = \text{radius}$, $h = \text{height}$)



Calculate the volume of a cylinder with radius 12cm and height 25cm.

[AT]

QUESTION SIX

Simplify the following

(a) $2w + 3y + 8w - y =$ _____ [AT]

(b) $6x \times 9 =$ _____ [AT]

(c) $\frac{6c^3}{c} =$ _____ [AB]

(d) $5e \times 7e =$ _____ [AB]

(e) $7y^5 \times 3y^4 =$ _____ [AB]

QUESTION SEVEN

Expand and simplify the following

(a) $6(x + 9) =$ _____ [AT]

(b) $w(w - 8) =$ _____ [AT]

(c) $4(3y - 2) - 3(5y + 2) =$ _____ [AB]

QUESTION EIGHT

Solve the following equation

(a) $x - 4 = 10$

_____ [AT]

(b) $6(x - 4) = 30$

_____ [AB]

(c) $7x + 6 = 4x - 6$

_____ [AB]

QUESTION NINE

Factorise the following equations

(a) $3y + 12 =$ _____ [AT]

(b) $4x^3 - 10x =$ _____ [AT]

(c) $5x^5y^6 - 10x^7y^4 =$ _____

[AT]

Planning