



Name: _____

**Year 10 Stage 5.2 Mathematics
Assignment Term 3 2023**

**Single variable and bivariate statistics, Equations and Linear Relationships, and
Problem Solving**

Task number: 3

Weighting: 15%

Due Date: 30/8/2023

Outcomes assessed:

MA5.2-2WM interprets mathematical or real-life situations, systematically applying appropriate strategies to solve problems

MA5.2-8NA solves linear equations, linear inequalities and linear simultaneous equations, using analytical and graphical techniques

MA5.2-9NA uses the gradient-intercept form to interpret and graph linear relationships

MA5.2-15SP uses quartiles and box plots to compare sets of data, and evaluates sources of data

MA5.2-16SP investigates relationships between two statistical variables, including their relationship over time

Nature and description of the task:

As a result of completing this Assignment, students should be familiar with the topics:

- Linear Equations – two and three step equations, variable on both sides, simultaneous equations, inequalities.
- Linear Relationships – graphing lines by various methods, using gradient, distance, midpoint formulas.
- Single variable data analysis – mean, median, mode, range, quartiles and outliers. Box plots, dot plots, histograms and stem-and-leaf plots.
- Bivariate data analysis – time graphs, scatter plots, correlation, interpolation.
- Problem Solving.

On the 30th of August 2023 you will be required to hand in this assignment to your classroom teacher and you will then receive a similar selection of questions to complete in 20 minutes in an in-class Validation Task. The final mark for this assessment (15% of your final grade) will be split between the take home assignment and the final in class validation.

Take home preparation section = 70%

In-class Validation = 30%

NOTE: You will NOT have access to the Preparation Activity during the Validation Task. You will NOT be given any answers to the Preparation Activity.

Non-Completion of Task:

If you know you are going to be away on the day the Assessment Task is due and are unable to hand in the Assignment on the due day, then you must have supportive documentation.

OUTCOME	MARKS
<p>Equations and Inequalities –</p> <p>MA5.2-8NA solves linear equations, linear inequalities and linear simultaneous equations, using analytical and graphical techniques</p>	/15
<p>Linear Relationships –</p> <p>MA5.2-9NA uses the gradient-intercept form to interpret and graph linear relationships</p>	/13
<p>Single Variable Data Analysis –</p> <p>MA5.2-15SP uses quartiles and box plots to compare sets of data, and evaluates sources of data</p>	/16
<p>Bivariate Data Analysis –</p> <p>MA5.2-16SP investigates relationships between two statistical variables, including their relationship over time</p>	/6
<p>Problem Solving –</p> <p>MA5.2-2WM interprets mathematical or real-life situations, systematically applying appropriate strategies to solve problems</p>	/8
<p>TOTAL</p>	/58

Section I: Equations and Inequalities

1 Solve each of the following equations.

a $6a = 24$

b $\frac{a}{3} = 9$

c $4m + 5 = 13$

d $\frac{x}{2} + 4 = 15$

($\frac{1}{2} + \frac{1}{2} + 2 \times 1 = 3$ marks)

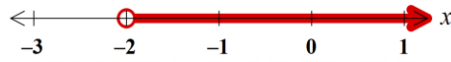
2 Solve each of the following equations.

a $3(a + 5) = 25$

b $3(2x - 1) + 2(x + 3) = 27$

($2 + 2 = 4$ marks)

- 3 a Write the inequality displayed on the following number line.



- b Solve each of the following inequalities and then show each solution on a number line.

i $x + 4 \leq 8$



ii $-2x < 10$



(1 + (1 + 1) = 3 marks)

- 4 In each of these questions, choose a pronumeral to represent the unknown number, then write an equation and solve it for the unknown number.

- a If 9 more than double a certain number gives a result of 35, what is the number?

- b When 8 is subtracted from a certain number and that result is divided by 4, the answer is 12. What is the number?

(1 + 2 = 3 marks)

- 5 Solve the simultaneous equations $2x + 3y = 4$ and $3x + y = 13$ by using either the elimination method or substitution method.

(2 marks)

Equations and Inequalities Total /15

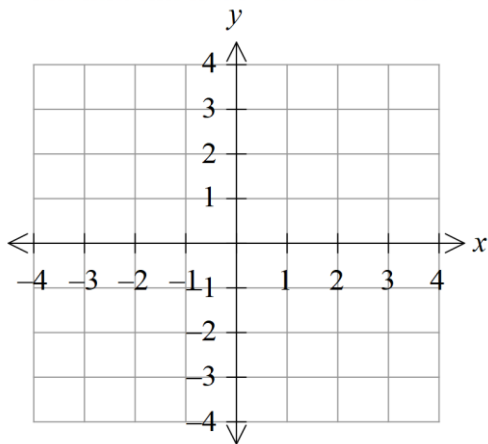
End of Section I.

Section II begins on next page.

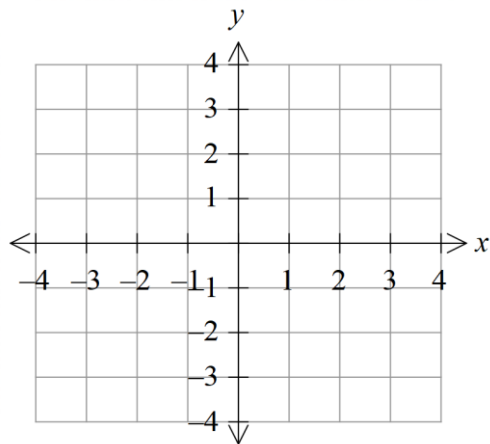
Section II: Linear Relationships

1 For each of the following rules, use the y-intercept and gradient to plot two points and then sketch the graph.

a $y = 5x - 2$



b $y = -\frac{4}{3}x + 2$

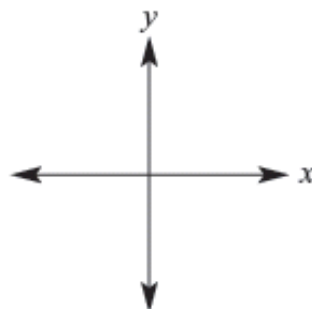
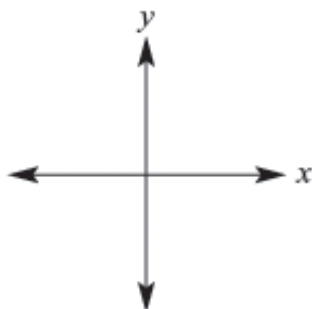


(1 + 1 = 2 marks)

2 For each of the following equations, find the axis intercepts and sketch the graphs labelling the intercepts.

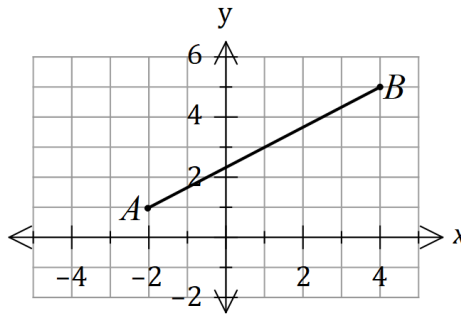
a $y = 3x + 6$

b $4x + 3y = 12$



(1 + 1 = 2 marks)

3 This graph shows the line segment AB. Find:



a the length AB, to 1. d. p.

b the midpoint of AB.

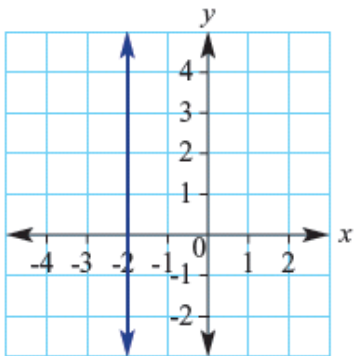
(1 + 1 = 2 marks)

4 Find the rule, in terms of x and y , for a line with gradient 3 and passing through (0, 8).

(1 mark)

6 For the following lines, determine the:

a

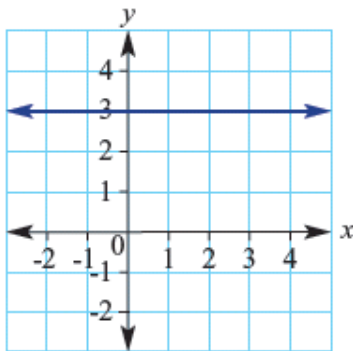


i gradient _____

ii x-intercept _____

iii equation _____

b

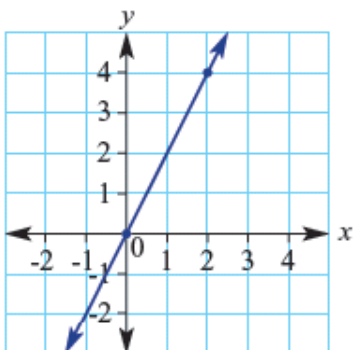


i gradient _____

ii y-intercept _____

iii equation _____

c

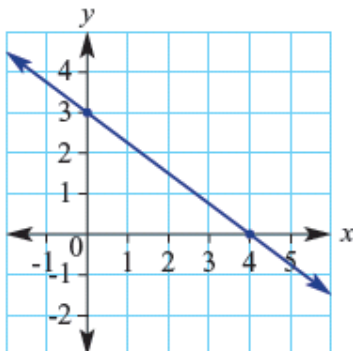


i gradient _____

ii y-intercept _____

iii equation _____

d



i gradient _____

ii y-intercept _____

iii equation _____

$(4 \times (\frac{1}{2} + \frac{1}{2} + \frac{1}{2})) = 6$ marks)

Linear Relationships Total /13

End of Section II.

Section III begins on next page.

Section III: Single Variable Data Analysis

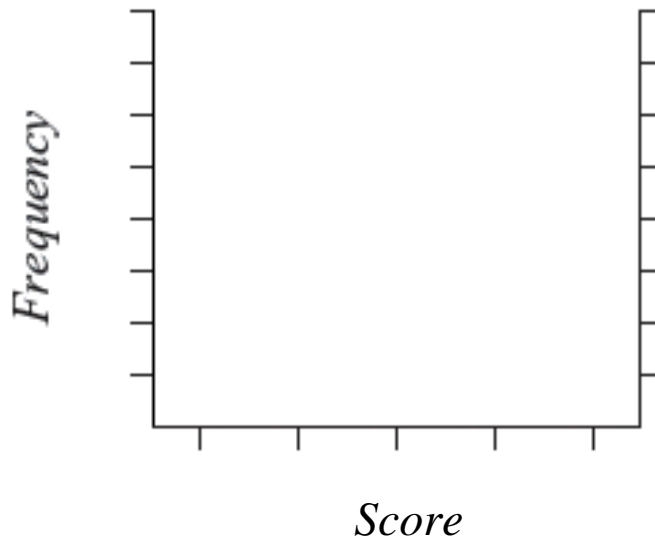
- 1 The data below shows the test scores out of 100 of a class of 28 students for An English essay test.

74 65 54 77 85 68 93
59 71 82 87 98 73 66
88 76 92 70 77 65 68
81 79 80 75 90 60 82

- a Complete the following frequency table for the data, using class intervals of 10.

Class interval	Frequency
50-59	
60-69	
70-79	
80-89	
90-99	
Total	

- b Construct a histogram for the data.



- c What fraction of the class scored 80% or above on the essay?

(1 + 2 + 1 = 4 marks)

2 Consider the given data set:

9 8 9 10 11 13 14 8 13 0 12 5 8

a List the data in order, from smallest to largest.

b For the data, find:

i the minimum and maximum values _____

ii the range _____

iii the mode _____

iv the mean, correct to one decimal place _____

v the median (Q_2) _____

vi the lower and upper quartiles
(Q_1 and Q_3) _____

vii the interquartile range (IQR) _____

c Draw a boxplot to summarise the data, marking outliers if they exist.

$(1 + (2 + 1 + 1 + 1 + 1 + 2 + 1) + 2 = 12$ marks)

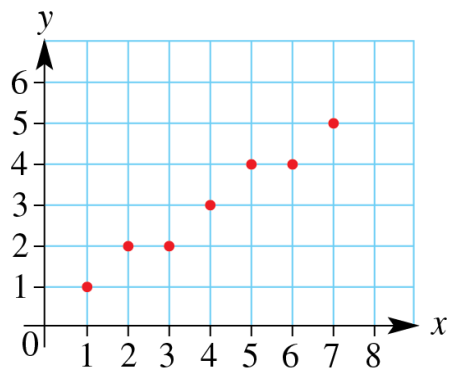
Singe Variable Data Analysis Total /16

End of Section III.

Section IV begins on next page.

Section IV: Bivariate Data Analysis

1 Consider the scatter plot below showing the variables x and y for the bivariate data.

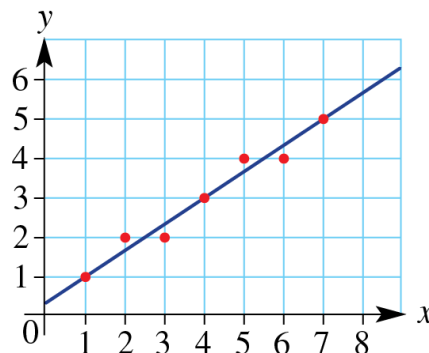


a Complete the table for the variables x and y and the corresponding bivariate data.

x								
y								

b Is there strong positive, weak positive, strong negative, weak negative or no correlation between x and y ?

c The line of best fit is shown on the graph below.



Use this line of best fit to estimate:

i y when $x = 8.5$ _____

ii x when $y = 4$ _____

iii y when $x = 10$ _____

(2 + 1 + 1 + 1 + 1 = 6 marks)

Bivariate Data Analysis Total /6

End of Section IV.

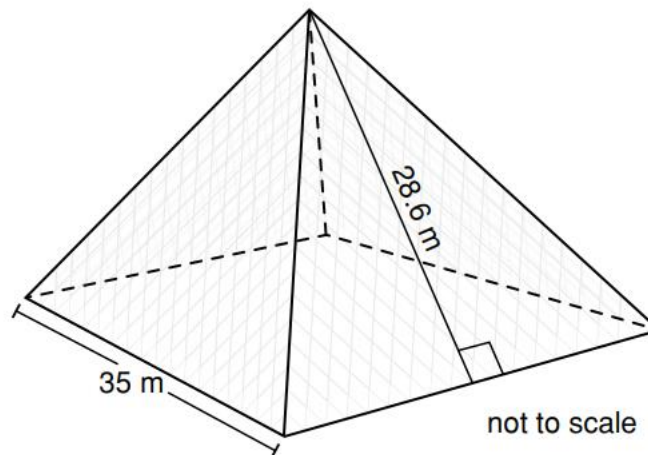
Section V begins on next page.

Section IV: Problem Solving

- 1 There are 52 people in a conference room.
The ratio of females to males in the room is 15 to 11.
How many females need to leave the room so that the ratio of females to males in the room is 1 to 1?

- 2 A school vegetable garden has:
- 4 lettuce plants
 - 2 less capsicum plants than spinach plants
 - 4 times as many spinach plants as lettuce plants
 - 1 parsley plant, 1 sage plant and 1 basil plant and
 - the number of spinach plants is a quarter of the number of tomato plants.
- How many plants are growing in the school vegetable garden?

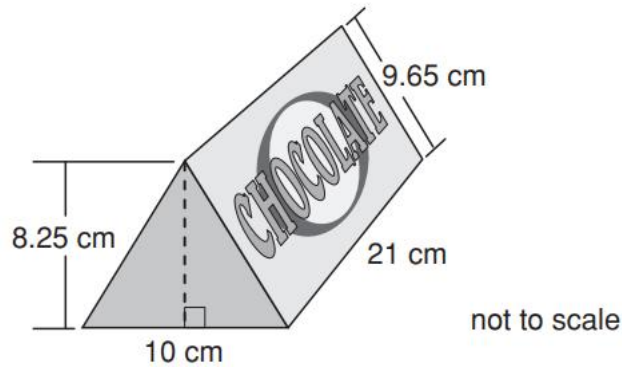
- 3 The Louvre Pyramid in Paris, France, is made up of four triangles and a square.



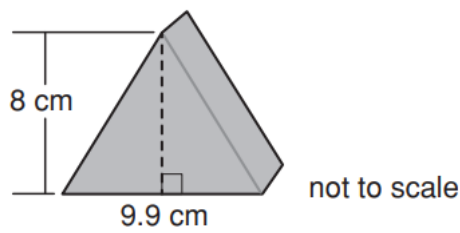
Roland is hired to clean the interior sides and the floor of the Louvre Pyramid.

What is the area that Roland will need to clean?

4 The box below contains triangular pieces of chocolate.



Each piece of chocolate is 75cm^3 in size, as below.



What is the maximum number of pieces of chocolate that can fit inside the box?

(1 + 2 + 2 + 3 = 8 marks)

Problem Solving Total /8

End of task.