

Name: _____

Teacher: _____

Year 9 MATHEMATICS STANDARD

2025

TASK 2 – Half Yearly Examination

General Instructions

- Reading time – 5 minutes
- Working time – 90 minutes
- Show all necessary working / units
- Board approved calculators are allowed
- Exam guidelines
 - ✓ Use black pen for your working
 - ✓ Use a pencil and ruler for diagrams
 - ✓ Marks may be lost for poorly organised written work.

Total Marks – 80

Section 1 – 40 marks

Allow 40 minutes

Section 2 – 40 marks

Allow 50 minutes

Question	Indices	Expressions, Algebraic Fractions and Equations	Linear Relationships	Total
Section 1 Core				/40
1, 2, 7	/13			
3, 4, 8		/13		
5, 6, 9			/14	
Section 2 Standard				/40
1, 2, 7	/13			
3, 4, 8		/13		
5, 6, 9			/14	
	/26	/26	/28	/80

Section 1 – Core (40 marks)

Attempt questions 1 – 9

Allow approximately 40 minutes for this section

Multiple Choice Questions (6 marks) – Circle the correct option on the answer paper.

1. Which of the following is equal to $2^2 \times 2^4$?

A. 4^8

B. 2^8

C. 4^6

D. 2^6

2. Which of the following is equal to $(-4f)^0$?

A. 0

B. 1

C. -4

D. $-4f$

3. Solve the equation: $5a = 15$

A. $a = 10$

B. $a = 3$

C. $a = -3$

D. $a = 20$

4. Simplify the expression: $3x + 2y + x + 7y$

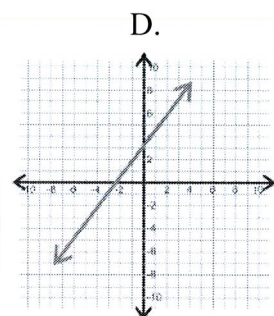
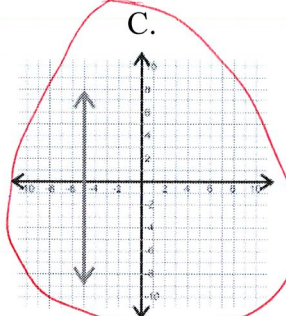
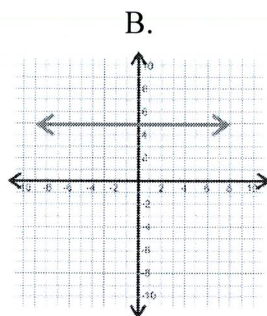
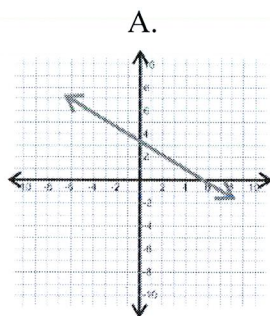
A. $6x + 5y$

B. $4x + 9y$

C. $2x - 9y$

D. $3x - 9y$

5. Which of the following lines has an undefined gradient?



6. Select the coordinates for the y-intercept shown in the table below:

x	-2	-1	0	1	2
y	8	6	4	2	0

A. (0,4)

B. (0,2)

C. (4,0)

D. (2,0)

Short Answer Questions (34 marks)

Answer the questions in the spaces provided. Your responses should include relevant mathematical reasoning and/or calculations.

Marks **CANNOT** be awarded for poorly organised written work.

Question 7 – Indices (11 marks)

a) Simplify the following expressions by writing in index form:

i. $3 \times 3 \times 3 \times 3 \times 3 \times 3$ (1)

3^6

ii. $5^4 \times 5^2 \times 5^3$ (1)

5^9

iii. $y \times xy \times yx \times y$ (1)

x^2y^4

iv. $a^{13} \times a^2$ (1)

a^{15}

v. $c^9 \div c^4$ (1)

c^5

vi. $(7^5)^2$ (1)

7^{10}

vii. $\left(\frac{2}{r^3}\right)^2$ (2)

$$\frac{2^2}{(r^3)^2} = \frac{2^2}{r^6}$$

b) Express the following in scientific notation: (1)

0.0000000001 m

$$1 \times 10^{-10}$$

c) Express the following in scientific notation to 4 significant figures: (2)

4 060 990 327

$$4\,061\,000\,000$$

$$4.061 \times 10^9$$

$$4.060990327 \times 10^9$$

$$4.061 \times 10^9$$

Question 8 – Expressions and Equations (11 marks)

a) Simplify the following expressions:

i. $8y + 6xy + xy - 4y$ (1)

$4y + 7xy$

ii. $9pq \times (-5)$ (1)

$-45pq$

iii. $\frac{27pq}{6p}$ (2)

$\frac{27q}{6}$
 $\frac{9q}{2}$

b) Expand the following expression: (1)

$4(2 + x)$

$8 + 4x$

c) Solve the following equations:

i. $2 = x + 5$ (1)

$x = 2 - 5$

$x = -3$

ii. $\frac{y}{5} - 4 = 2$ (2)

$\frac{y}{5} = 2 + 4$

$\frac{y}{5} = 6$

$y = 6 \times 5$

$y = 30$

iii. $5(3 - x) = 25$

(2)

$$15 - 5x = 25$$

$$-5x = 10$$

$$x = -2$$

- d) A prize of \$1500 is divided between David and Anita so that Anita receives \$180 (1) more than David. Write an equation to find how much each person received.

$$A = D + 180$$

$$1500 = D + D + 180$$

$$2D = 1320$$

No need to find the answer.

$$A + D = 1500$$

Not sufficient.

Question 9 – Linear Relationships (12 marks)

- a) Complete the table for the following equation: (2)

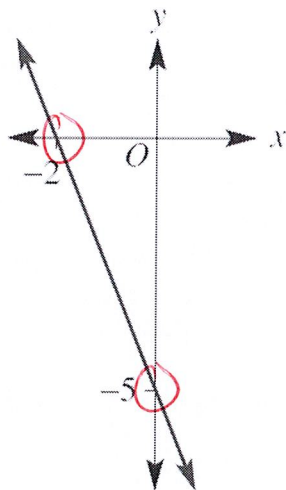
$$y = 4x + 7$$

x	-2	-1	0	1	2
y	-1	3	7	11	15

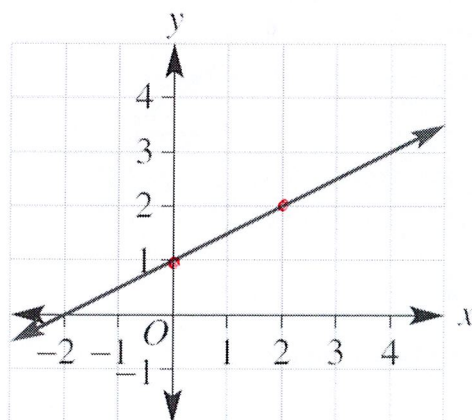
- b) Identify the x-intercept and the y-intercept from the following graph: (2)

x-intercept = -2

y-intercept = -5



- c) Find the gradient of the line in the following graph: (1)



rise = 1

run = 2

$m = \frac{1}{2}$

d) State the gradient and y-intercept of the following straight lines:

i. $y = 3x - 4$ (1)

$m = 3$

$y\text{-int} = -4$

ii. $y = -4x$ (1)

$m = -4$

$y\text{-int} = 0$

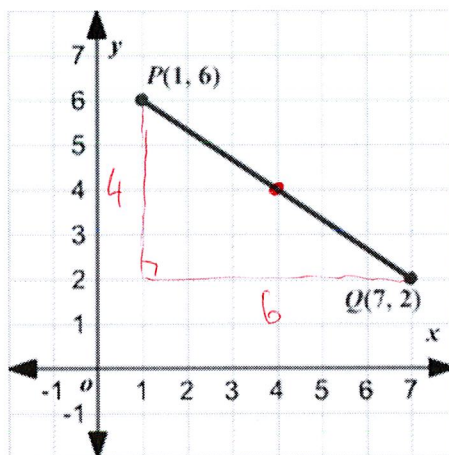
iii. $x - y = 3$ (1)

$y = x - 3$

$m = 1$

$y\text{-int} = -3$

e) The following graph shows the line segment with endpoints $P(1,6)$ and $Q(7,2)$



i. Find the midpoint of the line segment. (2)

$M\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$

$\left(\frac{1+7}{2}, \frac{6+2}{2}\right)$

$(4, 4)$

- ii. Find the length of the line segment to 2 decimal places. (2)

$$L = \sqrt{6^2 + 4^2}$$
$$= 7.21$$

End of Section I (Core)

Section II (Standard) begins on the next page

Section 2 – Standard (40 marks)

Attempt questions 1 – 9

Allow approximately 50 minutes for this section

Multiple Choice Questions (6 marks) – Circle the correct option on the answer paper.

1. Which of the following is equal to $4f^2 \times 2f^{-4}$?

$= 8f^{-2}$

A. $6f^{-8}$

B. $8f^{-2}$

C. $6f^{-2}$

D. $8f^{-8}$

2. Which of the following is equal to $\frac{(n^3)^4}{n^5}$?

$= \frac{n^{12}}{n^5} = n^7$

A. n^7

B. n^2

C. $\frac{1}{n^2}$

D. n^{-7}

3. Expand the following expression: $5b(b + 1) - 7$

$5b^2 + 5b - 7$

A. $5b - 6$

B. $5b + 8$

C. $5b^2 + 5b - 7$

D. $10b - 7$

4. Evaluate the following equation if $v = 7$, $t = 4$, $a = 9$

$(7 \times 4) + \left(\frac{9 \times 4^2}{2} \right) = 100$

$v \times t + \frac{a \times t^2}{2}$

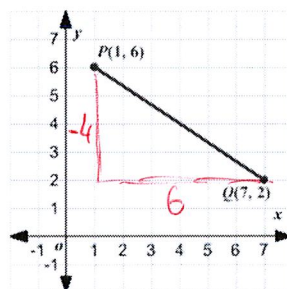
A. 676

B. 100

C. 2016

D. 46

5. What is the gradient of the following line segment?



rise = -4
run = 6

$m = \frac{-4}{6} = \frac{-2}{3}$

A. $\frac{2}{3}$

B. $\frac{-3}{2}$

C. $\frac{3}{2}$

D. $\frac{-2}{3}$

6. Which of the following points lies on the line $y = 2x - 4$?

~~$2 = 2 \times 0 - 4$~~

A. (0, 2)

~~$5 = 2 \times 6 - 4$~~

B. (6, 5)

$2 = 2 \times 3 - 4$

C. (3, 2)

~~$0 = 2 \times 4 - 4$~~

D. (4, 0)

Short Answer Questions (34 marks)

Answer the questions in the spaces provided. Your responses should include relevant mathematical reasoning and/or calculations.

Marks **CANNOT** be awarded for poorly organised written work.

Question 7 – Indices (11 marks)

- a) Express 500 as a product of prime factors in index form (1)

$$500 = 250 \times 2$$

$$= 2 \times 5 \times 50$$

$$= 2 \times 5 \times 5 \times 10$$

$$= 2 \times 5 \times 5 \times 5 \times 2$$

$$= 2^2 \times 5^3$$

- b) Simplify the following expressions:

i. $\frac{8m^5n^4}{6m^4n^3}$ (2)

$$\frac{8mn}{6}$$

$$\frac{4mn}{3}$$

ii. $\frac{4x^2b \times 9x^3b^2}{3xb}$ (3)

$$\frac{36x^5b^3}{3xb}$$

$$\frac{36x^4b^2}{3}$$

$$12x^4b^2$$

iii. $6(m^3)^2 \times (n^5)^3 \times (2n)^2$ (2)

$$6m^6 \times n^{15} \times 4n^2$$

$$24m^6n^{17}$$

iv. $15(m^5)^0 \times (n^2)^7$ (1)

$$15m^0 \times n^{14}$$

$$15 \times 1 \times n^{14}$$

$$15n^{14}$$

c) Express the following with positive indices:

i. 2×3^{-2} (1)

$$2 \times \frac{1}{3^2}$$

$$= \frac{2}{3^2}$$

ii. $\frac{1}{4^{-3}}$ (1)

$$\frac{4^3}{1}$$

$$= 4^3$$

Question 8 – Expressions and Equations (11 marks)

- a) Simplify the following expression: (1)

$$8 \times (-w) \times 4 \times (-y)$$

$$32yw$$

- b) Sarah buys 3 pies during a sale and receives a \$4 discount. How much would a single pie cost if Sarah only paid \$12 in total? Write the equation algebraically and solve to find the number correct to 2 decimal places. (2)

$$3x - 4 = 12$$

$$3x = 16$$

$$x = \$5.33$$

- c) Expand and simplify the following expression: (2)

$$2x(x - 3) + 2x$$

$$2x^2 - 6x + 2x$$

$$2x^2 - 4x$$

- d) Solve the following equations:

- i. $13(3 + x) = 52$ (2)

$$3 + x = 4$$

$$x = 1$$

$$39 + 13x = 52$$

$$13x = 13$$

$$x = 1$$

ii. $\frac{y-3}{5} = -5$

(2)

$$y-3 = -25$$

$$y = -22$$

iii. $8 - 2b = 4b + 14$

(2)

$$8 = 6b + 14$$

$$-6 = 6b$$

$$b = -1$$

Question 9 – Linear Relationships (12 marks)

- a) Rearrange the following equation into the form $y = mx + c$ (1)

$$3x + y = 4$$

$$y = 4 - 3x$$

$$y = -3x + 4$$

- b) Using the following equation

$$y = \frac{1}{4}x + 1$$

- i. Find the x -intercept and y -intercept. (2)

x -int (where $y=0$)

$$0 = \frac{1}{4}x + 1$$

$$\frac{1}{4}x = -1$$

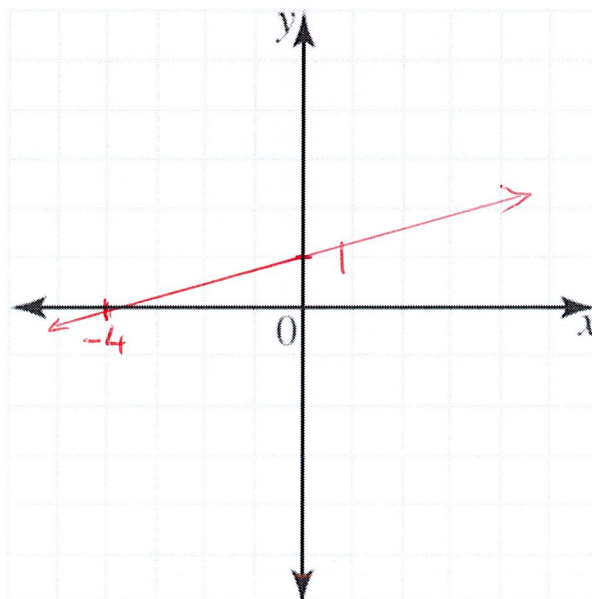
$$x = -4$$

y -int (where $x=0$)

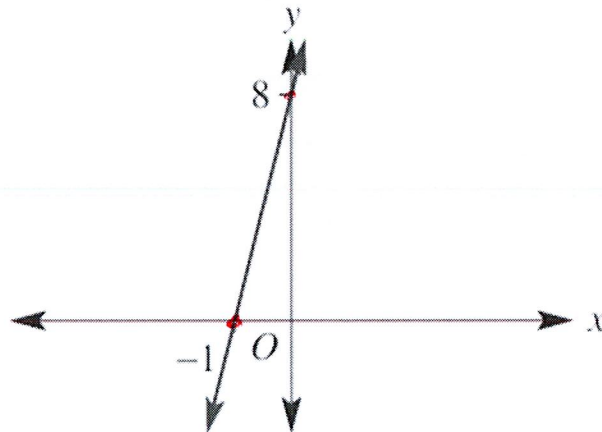
$$y = 0 + 1$$

$$y = 1$$

- ii. Sketch the line, labelling the x and y intercepts. (1)



c) For the following line:



i. Calculate the gradient.

(1)

$$\text{rise} = 8$$

$$\text{run} = 1$$

$$m = \frac{8}{1} = 8$$

ii. Hence, find the equation of the line in $y = mx + c$ form.

(1)

$$y\text{-int} = 8 \text{ (given on graph)}$$

$$y = 8x + 8$$

d) Find the equation of the line which has a gradient of -1 and passes through the point $(4,4)$.

(2)

$$m = -1$$

$$y = -x + c$$

$$\text{use } (4,4) \text{ as } (x,y)$$

$$4 = -4 + c$$

$$c = 8$$

$$y = -x + 8$$

- e) Find the gradient of the line which passes from Point A to Point B, where A(4,3) (1)
and B(16,7).

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{7 - 3}{16 - 4}$$

$$= \frac{4}{12}$$

$$= \frac{1}{3}$$

- f) A petrol tank holds 66 litres of petrol. If it starts with 12 litres of petrol and the petrol pump fills it at 3 litres every minute.

- i. Find the linear equation for the amount of fuel (F litres) in the tank after t minutes (2)

$$F = 12 + 3t$$

- ii. How long will it take to fill the tank? (1)

$$\text{when } F = 66$$

$$66 = 12 + 3t$$

$$3t = 54$$

$$t = 18 \text{ minutes}$$

END OF EXAM



Indices

$$a^m \times a^n = a^{m+n}$$

$$\frac{a^m}{a^n} = a^m \div a^n = a^{m-n}$$

$$(a^m)^n = a^{m \times n}$$

$$a^0 = 1$$

$$a^{-m} = \frac{1}{a^m}$$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$$

Gradient-intercept form of straight line

$$y = mx + c$$

Gradient

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Midpoint

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Distance

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Pythagoras' theorem

$$a^2 + b^2 = c^2$$