



Student Name: _____

Year 10 MATHEMATICS 5.1/5.2 2022

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 5.1 – 40 marks

Suggested time: 40 mins

Section 2 5.2 – 40 marks

Suggested time: 50 mins

Examiner's use only				B.Su, D.Luo, E.Shing	
Question	Indices and Algebra	Equations and Formulas	Linear and non-linear relations	Right-angled triangles	Total
Section 1 (5.1)					/40
1-2,9-11	/8				
4-5,12-13,15		/11			
3,6,8,14,16-18			/18		
7,19				/3	
Section 2 (5.2)					/40
2-4,10,11	/10				
1,9,12		/7			
5-7,13-15,17			/20		
8,16				/3	
					/80

Attempt Questions 1 to 19

Multiple Choice Questions

- A. — 6

C. 15

D. 18

- A. 5

B. 7

C. 9

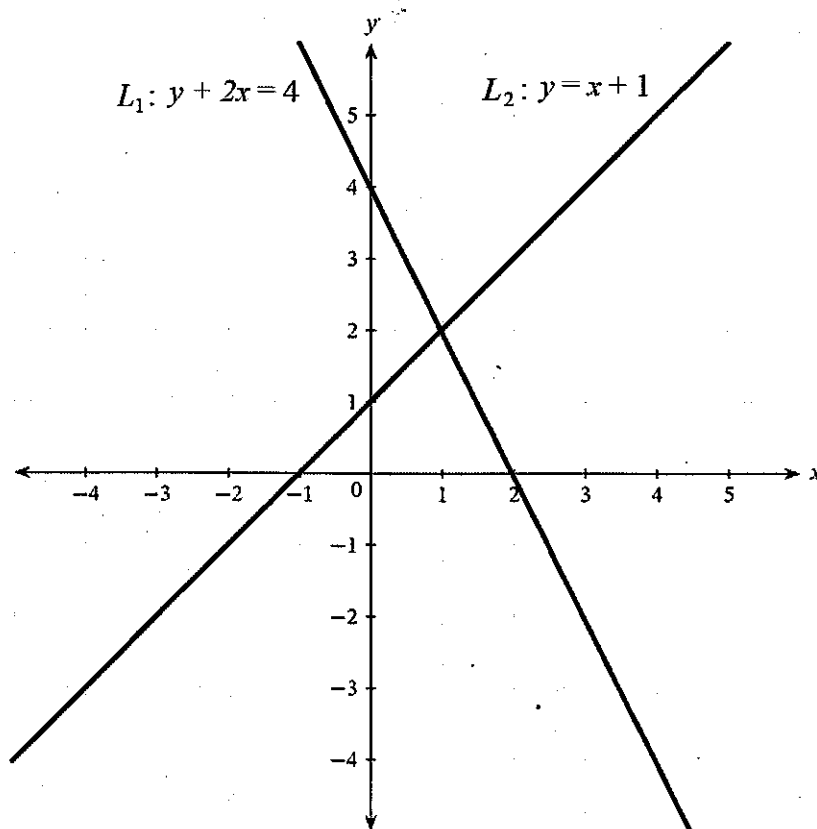
D. 10

- A. $x = -1, y = 0$

B. $x = 0, y = 4$

C. $x = 1, y = 2$

D. $x = 2, y = 0$



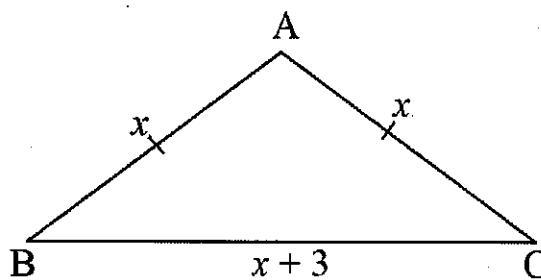
4. The perimeter of the triangle ABC is:

A. $x^2 + x + 3$

B. $x^3 + 3$

C. $2x^2 + 3$

☒ D. $3x + 3$



5. If $y - 3 = 4$, y is:

A. -3

B. 1

C. 4

☒ D. 7

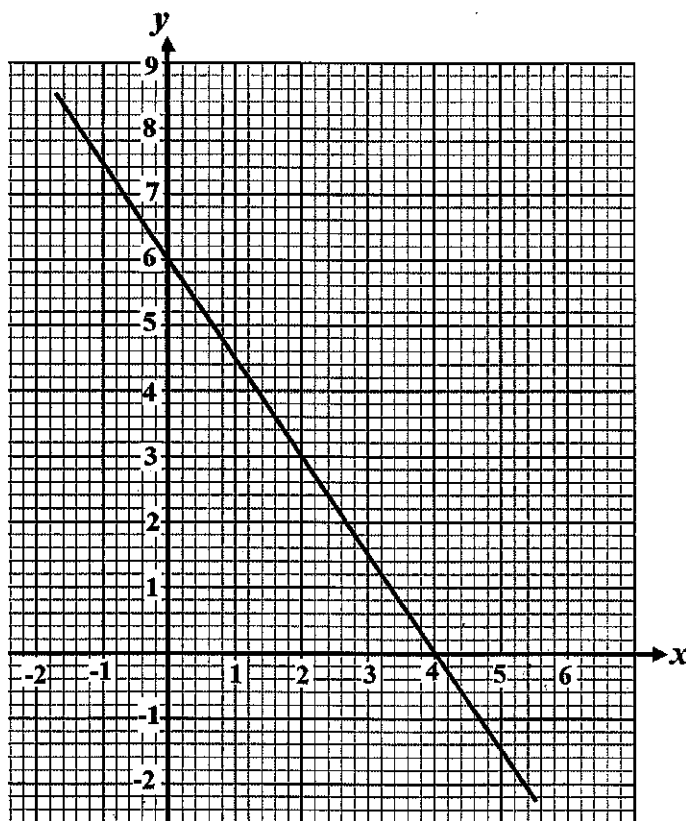
6. For the linear relationship below, the x-intercept of the graph is:

A. 6

☒ B. 4

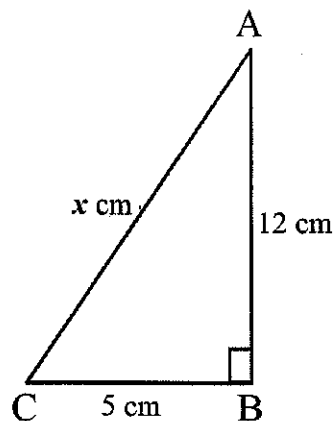
B. 2

C. 0



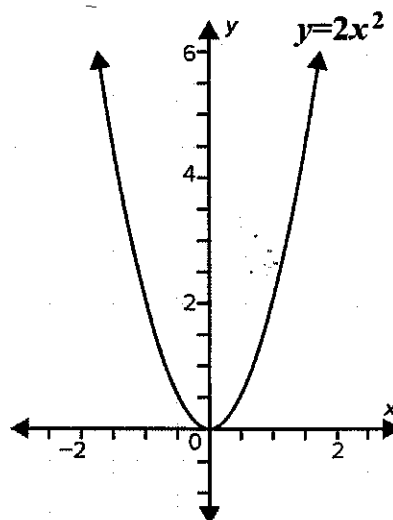
7. Using Pythagoras theorem, find the value of x in the right angled-triangle below:

- A. 5
- B. 12
- ☒ C. 13
- D. 17



8. In the graph $y = 2x^2$, when $x = 3$, the value of y is:

- A. 6
- B. 12
- C. 14
- ☒ D. 18



Short Answer Questions

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.

9. Find the simplest form of the expression $y + 7x - 3x + 5y$. (1 mark)

$$6y + 4x$$

10. Rewrite the number below in scientific notation to 3 significant figures. (2 marks)

475490

$$4.75 \times 10^5$$

11. Apply index laws to simplify the following expressions.

- a. $x^9 \div x^2$ (1 mark)

$$x^7$$

- b. $(y^2)^3$ (1 mark)

$$y^6$$

- c. $2x^3 \times x^2$ (1 mark)

$$2x^5$$

12. Expand

a. $2(3x+5)$

(1 mark)

$6x+10$

b. $-4(y-3)$

(1 mark)

$-4y+12$

13. Solve for the pronumerals in the following equations:

a. $x+5=8$

(1 mark)

$x=3$

b. $4-2x=0$

(2 mark)

$4=2x$

$x=2$

c. $\frac{x-2}{3}=1$

(2 marks)

$x-2=3$

$x=5$

14. From the linear relationship as shown, find:

- a. the y -intercept (b) of L . (1 mark)

..... 2

- b. the gradient (m) of L . (2 marks)

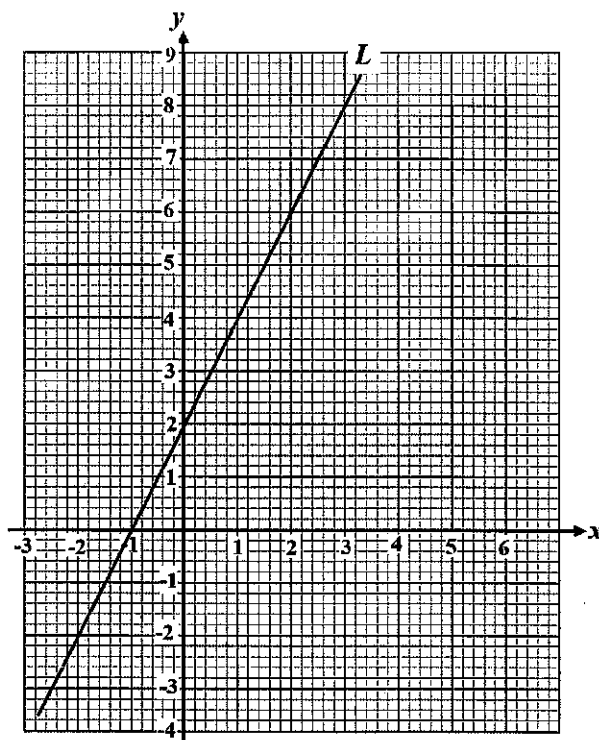
.....

..... $m = \frac{4}{2}$

..... = 2

- c. the equation of L . (1 mark)

..... $y = 2x + 2$



15. If $v = u + at$ and $u = 4$, $a = 10$, $t = 3$, find the value of v : (2 marks)

.....
 $v = 4 + 10 \times 3$
 $= 34$

16. The graph below shows a shopper's short walk in a shopping mall.

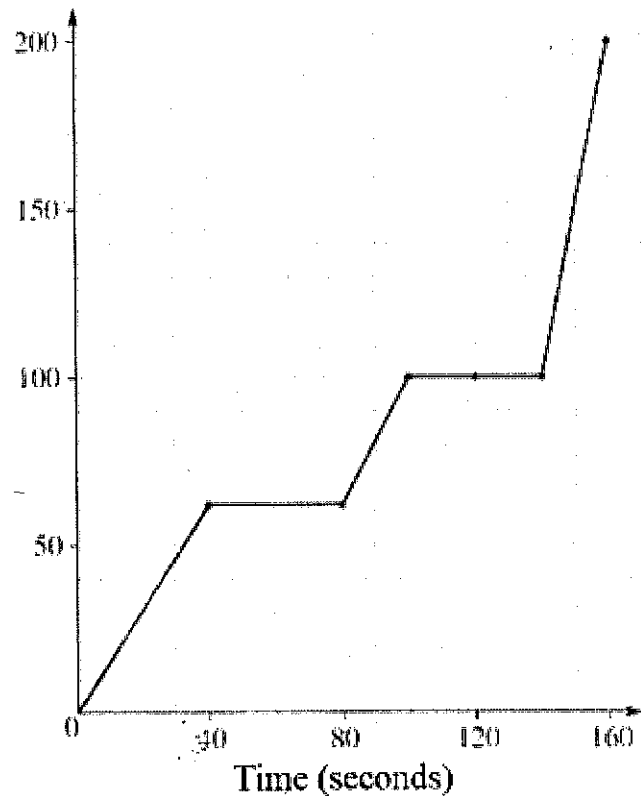
- a. What is the total distance the shopper travelled? (1 mark)

200m

- b. How long was the shopper not walking? (1 mark)

$40 + 40 = 80\text{s}$

Distance (metres)



- c. What was the total distance the shopper travelled after

- i. 20 seconds

(1 mark)

30m

- ii. 1.5 minutes

(1 mark)

80m

17. The unknown y is directly proportional to x . When x equals 5, y is 15.

a. Find the value of k and write the directly proportional equation.

(2 marks)

$$y = kx$$
$$15 = 5k$$
$$k = 3$$

$$y = 3x$$

b. Find the value of y if $x = 8$.

(1 mark)

$$y = 3 \times 8$$
$$= 24$$

c. Find the value of x if $y = 45$.

(1 mark)

$$45 = 3x$$
$$x = 15$$

18. John is paid A\$25 per hour to work in a supermarket.

a. How much will John receive for 6 hours of work?

(1 mark)

$$25 \times 6 = \$150$$

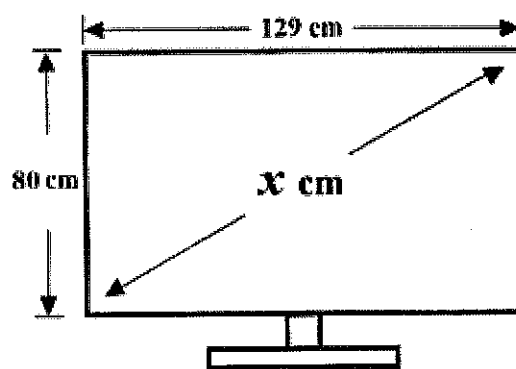
b. If he received A\$350 last week, how many hours did he work last week?

(2 marks)

$$350 \div 25 = 14 \text{ hrs}$$

- 19, Peter bought a TV of 129 cm long and 80 cm high. Calculate the length of the diagonal of this TV, correct to 1 decimal point. (2 marks)

$$X = \sqrt{80^2 + 129^2}$$
$$= 151.8 \text{ cm}$$



Section 2 – 5.2 (40 marks)

Attempt Questions 1 to 17.

Allow approximately 50 minutes for this section

Multiple Choice Questions. Circle the correct answer on the question paper.

1. A number is decreased by 8 and then doubled. The result is equal to 24. This can be written as:

A. $2x - 8 = 24$

☒ B. $2(x - 8) = 24$

C. $x - 8 = 2 \times 24$

D. $x - 8 \times 2 = 24$

2. $2 \times 4a^3$ is equal to:

A. $24a^3$

☒ B. $8a^3$

C. $64a^3$

D. $128a^3$

3. $(a^2b^3)^3$ is equivalent to:

☒ A. a^6b^9

B. a^5b^6

C. a^3b^9

D. a^2b^6

4. $4x^0 + 3$ is equal to:

A. 3

B. 4

C. 6

☒ D. 7

5. Which ONE of the following lines is parallel to $y = 2x + 4$?

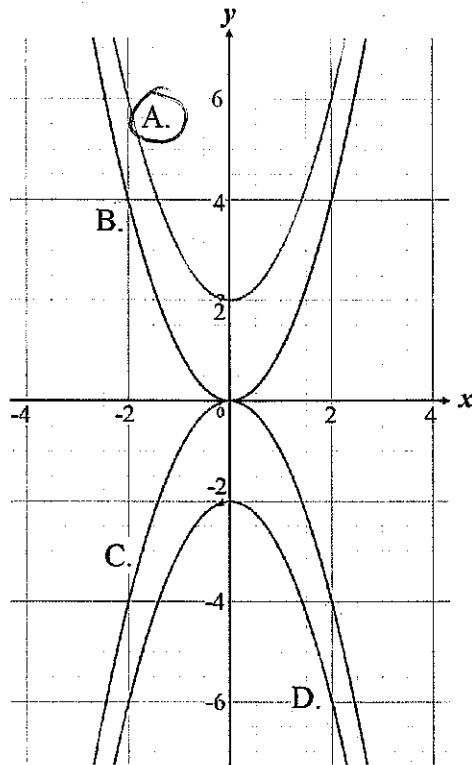
A. $y = -2x + 4$

B. $y = \frac{1}{2}x + 4$

☒ C. $y = 4x + 2$

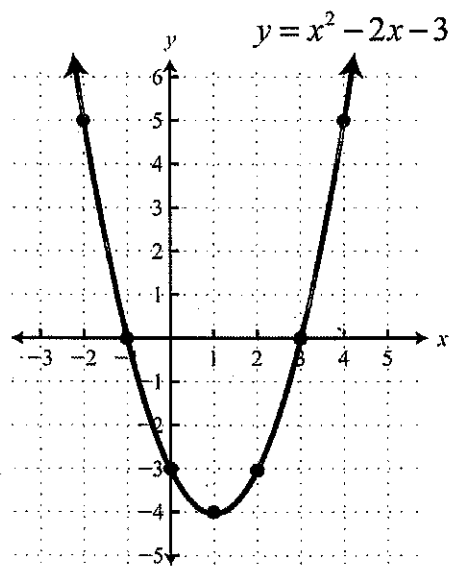
D. $y = 2x - 5$

6. The non-linear relationship, $y = x^2 + 2$ can be represented by



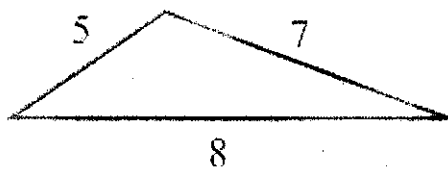
7. The turning point of the parabola below is:

- A. $(-1, 0)$
B. $(0, -3)$
☒ C. $(1, -4)$
D. $(3, 0)$

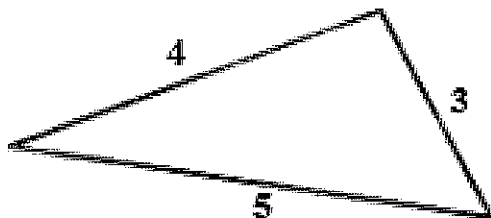


8. Which ONE of the following is a right-angled triangle? (All diagrams are not in scale.)

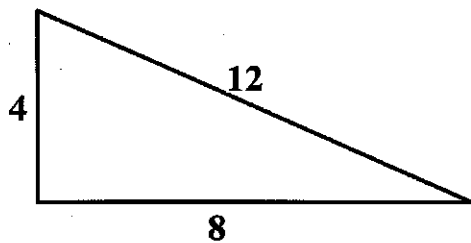
A.



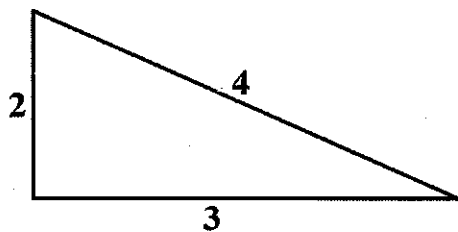
B.



C.



D.



Short Answer Questions

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.

9. Find x in the following equations.

a. $3(x + 1) = 9$

(2 marks)

$$x + 1 = \frac{9}{3} = 3$$

$$x + 1 = 3$$

$$x = 2$$

b. $\frac{x}{2} - 1 = 4$

(2 marks)

$$\frac{x}{2} = 4 + 1 = 5$$

$$x = 10$$

10. Expand and simplify:

a. $5 + 4(x - 2)$

(1 mark)

$$= 5 + 4x - 8$$

$$= 4x - 3$$

b. $3(2x + y) - 2x$

(2 marks)

$$= 6x + 3y - 2x$$

$$= 4x + 3y$$

11. Using index laws to simplify the following:

a. $3x^2 \times (2x)^3$

(2 marks)

$$= 3x^2 \times 8x^3$$
$$= 24x^5$$

b. $(x - 4x)^0 + 2 \times 7^0$

(2 marks)

$$= 1 + 2 \times 1$$
$$= 1 + 2 = 3$$

12. If $S = ut + \frac{1}{2}at^2$, if $u = 2$, $a = 10$ and $t = 3$, find the value of S .

(2 mark)

$$S = 2 \times 3 + \frac{1}{2} \times 10 \times 3^2$$

$$= 6 + 45$$

$$= 51$$

13. Solve the following simultaneous equations using suitable methods.

a. $x = y$

(2 marks)

$$3y = x + 4$$

$$3y = y + 4$$

$$3y - y = 4$$

$$2y = 4$$

$$y = 2$$

$$x = y = 2$$

$$\therefore x = 2, y = 2$$

b.

$$x + y = 11$$

①

$$x - y = 5$$

②

(2 marks)

$$\textcircled{1} + \textcircled{2}$$

$$x + y + (x - y) = 11 + 5$$

$$x + y + x - y = 16$$

$$2x = 16$$

$$x = \frac{16}{2} = 8$$

Subst. $x = 8$ into 1

$$8 + y = 11$$

$$y = 11 - 8$$

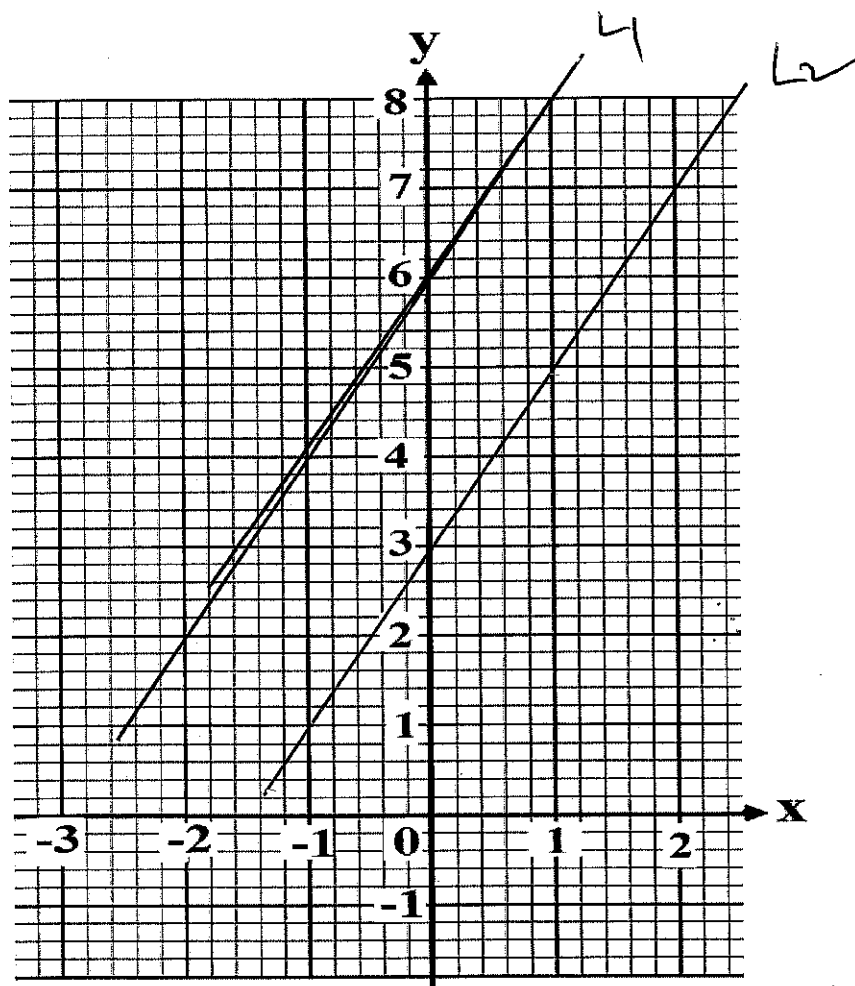
$$y = 3$$

$$x = 8, y = 3$$

14. a. Fill in the tables below for the given equation and then plot the graph of this equation on number plane below. (2 marks)

$$L_1: y = 2x + 6$$

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



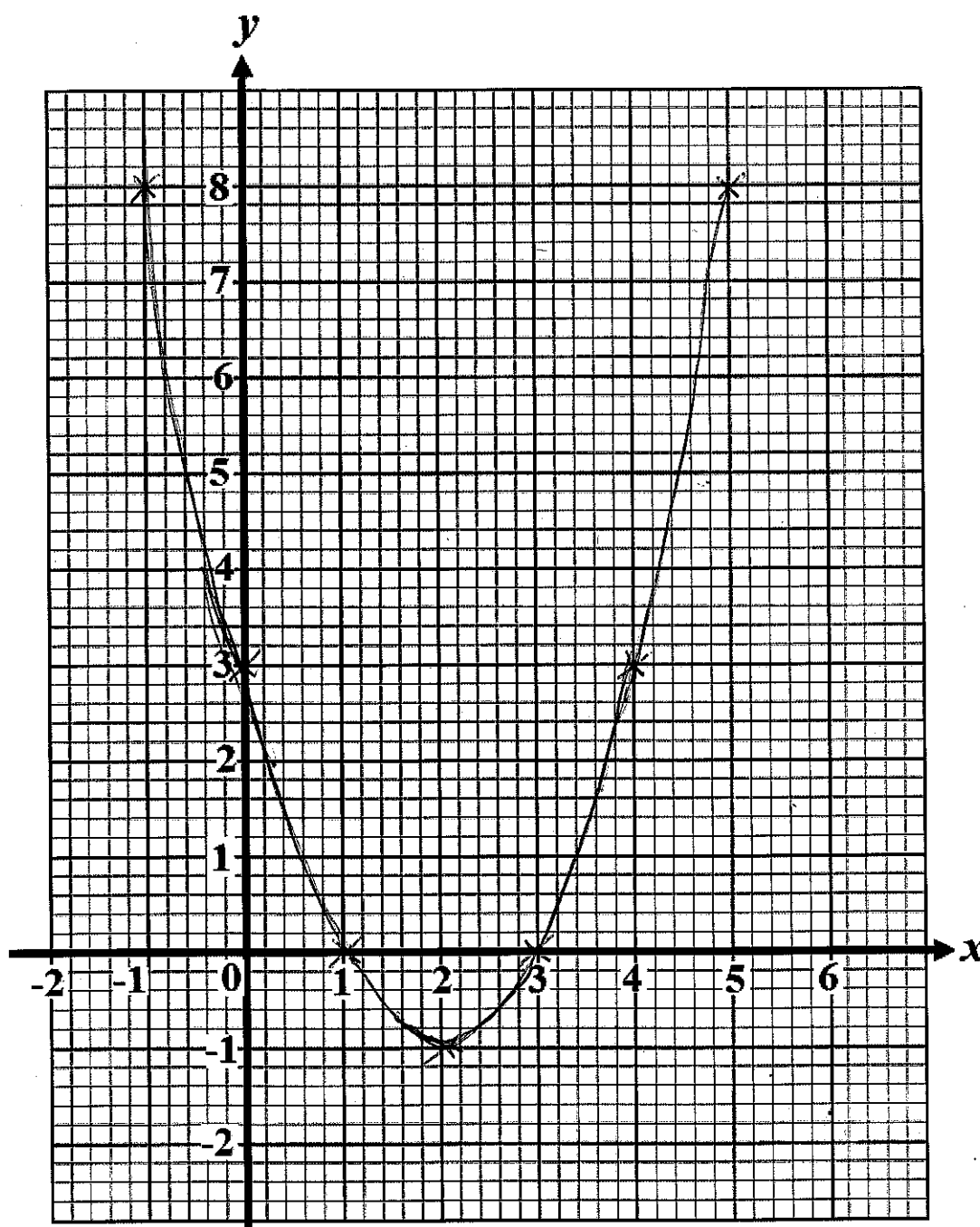
- a. If two lines are parallel, they have the same gradient m . On the number plane above, draw a line L_2 which is parallel to L_1 and with y -intercept equals 3. (1 mark)
- b. Find the equation of L_2 . (1 mark)

$$y = 2x + 3$$

15. a. Fill in the tables for the given equation below and then plot the graph of this equation on number plane below. (2 marks)

$$y = x^2 - 4x + 3$$

x	-1	0	1	2	3	4	5
y	8	3	0	-1	0	3	8



b. From the number plane above, find

i. The y-intercept.

(1 mark)

3

ii. The axis of symmetry.

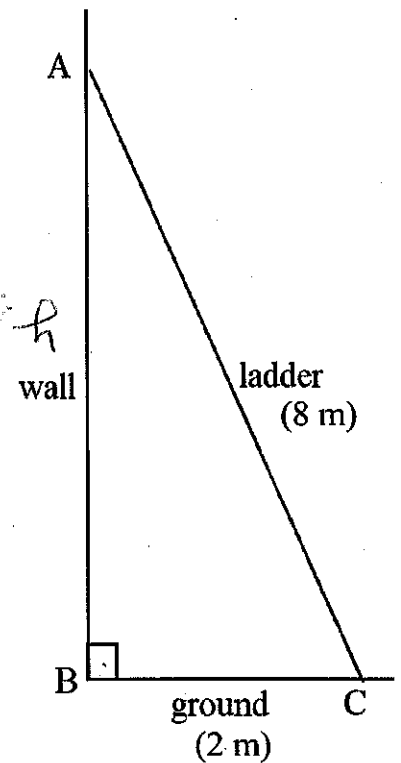
(1 mark)

$x = 2$

16. A 8 m ladder leans against a vertical wall. If the base of the ladder is 2 m from the wall, determine how high the ladder is up the wall, correct to 2 decimal points. (2 marks)

$$h^2 = 8^2 - 2^2$$

$$\begin{aligned} h &= \sqrt{64 - 4} \\ &= \sqrt{60} \\ &= 7.75 \text{ m} \end{aligned}$$



17. Peter delivers pizza for a fast-food restaurant. He is paid \$25 a shift plus \$3 per delivery.

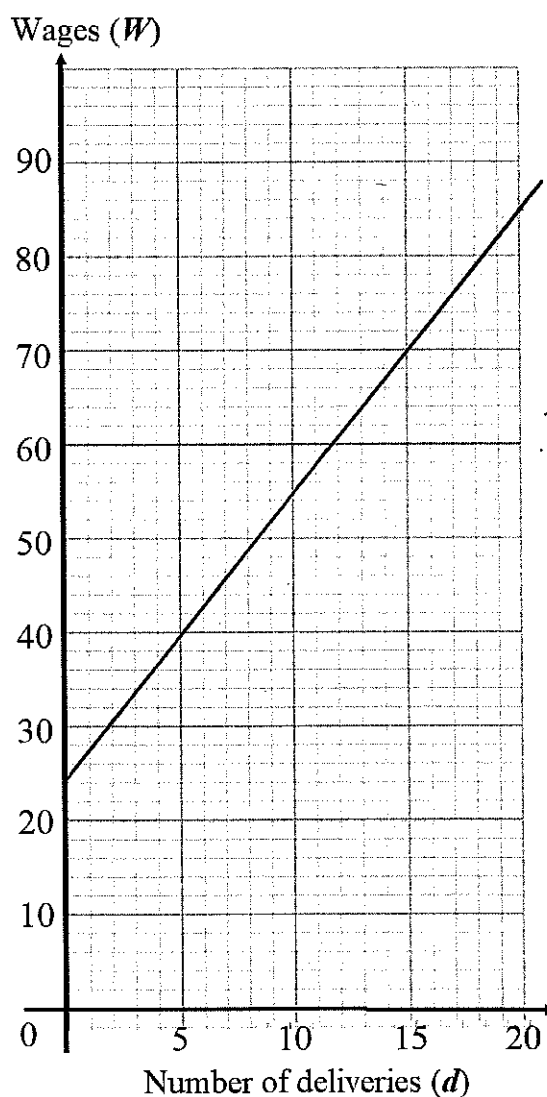
a. Complete the table of values below.

(1 mark)

No. of deliveries (d)	0	5	10	15	20
Wages (W)	25	40	55	70	85

b. Plot a graph of Peter's wages (W) against number of deliveries (d).

(1 mark)



c. Find the linear relationship between his wages (W) and the number of deliveries (d).

(1 mark)

$$W = 25 + 3d$$

d. Use the graph to determine:

(2 marks)

i. Peter's wages for 8 deliveries.

(1 mark)

$\$49$ (Between 47-50 are OK)

ii. The minimum number of deliveries made if Peter wants to earn more than \$60.

(1 mark)

12

End of Exam