

<b>Student Name:</b> _____	<b>Grade:</b> _____
<b>Date:</b> _____	<b>Score:</b> _____

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## 4 Year 9 Term 4 Week 4 Homework

### 4.1 Simultaneous Equations

#### 4.1.1 Solving problems using simultaneous equations

##### Exercise 4.1.1

1. The adjacent sides in a parallelogram are in the ratio 3:5 and the total perimeter is 112 cm. Find the length of the sides.

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2. The straight line with equation  $y = mx + b$  passes through the points (2, 10) and (-3, 25). Find the value for  $m$  and  $b$  and hence find the equation of the line.

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3. The diagonals of a rhombus are such that one diagonal is 2 cm longer than the other, while the area of the rhombus is  $24 \text{ cm}^2$ . Find the lengths of the diagonals and hence determine the perimeter of the rhombus.

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4. The length of a rectangle is 4 cm longer than its breadth. If both the length and breadth are increased by 1 cm, the area would be increased by  $18 \text{ cm}^2$ . Find the area of the rectangle.

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5. A man is three times as old as his son. In 3 years time the difference in their ages is 32 years. What are the ages of father and son?

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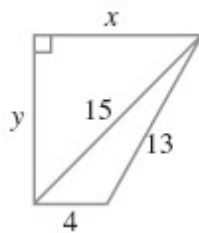
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6. Form a pair of simultaneous equations, then solve them to find the value for  $x$ ,  $y$ .




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### 4.2 Diagnostic Test

Question 1 ..... (10 marks)

Simplify the following expressions:

(a)  $\frac{2m-1}{4} + \frac{m-1}{3}$  [5]

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(a) \_\_\_\_\_

(b)  $\frac{1-4n}{3} - \frac{3n-2}{4}$  [5]

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(b) \_\_\_\_\_

Question 2 ..... (10 marks)

Write each of the following without using negative or fraction indexes:

(a)  $x^{-2m}$  [5]

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(a) \_\_\_\_\_

(b)  $(x^{n+2})^{-1}$  [5]

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(b) \_\_\_\_\_

Question 3 ..... (10 marks)

Solve the following simultaneous equation by either using substitution method or elimination method:

(a)  $4x - y = 3$  [5]  
 $2x + 3y = 11$

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(a) \_\_\_\_\_

(b)  $2x - 3y = 4$  [5]  
 $3x - 2y = 6$

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(b) \_\_\_\_\_

Question 4 ..... (20 marks)

In each quadrant does each point lie?

(a) (4, -2) [5]

(a) \_\_\_\_\_

(b) (-3, -1) [5]

(b) \_\_\_\_\_

(c) (-5, 7) [5]

(c) \_\_\_\_\_

(d) (1, 5) [5]

(d) \_\_\_\_\_

Question 5 ..... (10 marks)

How far apart are the points: (1, -4) and (3, 5)?

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5. \_\_\_\_\_

Question 6 ..... (10 marks)

At what point do the lines  $y = -x + 9$ , and  $y = \frac{1}{2}x + 3$  intersect?

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6. \_\_\_\_\_

Question 7 ..... (10 marks)

A pilot flew his light plane 240 km due east from F to G, then flew 475 km due north to H. Find as a true bearing the bearing of:

(a) H from F

[5]

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(a) \_\_\_\_\_

(b) F from H

[5]

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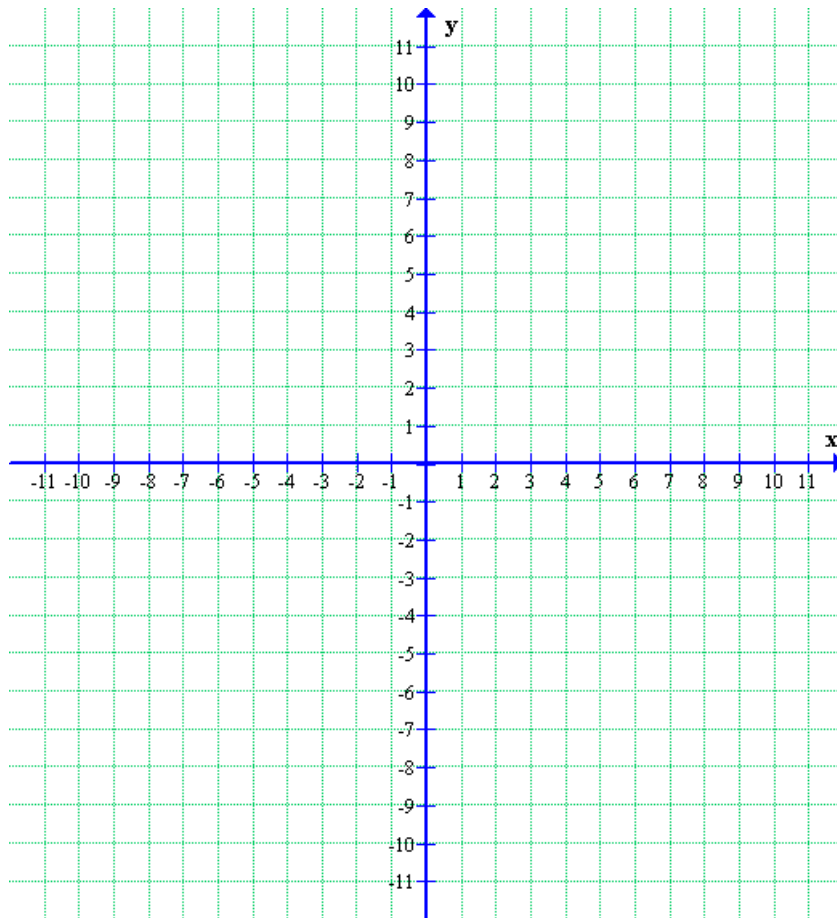
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(b) \_\_\_\_\_

Question 8 ..... (10 marks)

Graph the lines  $y = 2x + 1$  and  $y + x - 7 = 0$  on the same number plane. Hence find their point of intersection.




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8. \_\_\_\_\_

Question 9 ..... (10 marks)

Write down the equation of the line that has:

(a) a gradient of  $-\frac{2}{3}$  and a y-intercept of -3. [5]

(a) \_\_\_\_\_

(b) a slope of 2 and cuts the y-axis at 6. [5]

(b) \_\_\_\_\_

### 4.3 Miscellaneous Exercise

#### Exercise 4.3.1

1. A man paddles his canoe 60 km downstream for 5 hours. The next day, he paddles 48 km back upstream for 6 hours. Assume the man's rowing speed is constant at  $x$  km/h and the water is flowing at a constant speed of  $y$  km/h.

(a) Explain why  $x + y = 12$  and  $x - y = 8$

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(b) Hence, find the man's rowing speed in still water and the speed of the river current.

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2. A ship travels from A to B in 5 days. If it travels from B to A, it will take 7 days. Suppose the direction and the speed of the current remain constant. How long does it take for a raft floating along the water to go from A to B?

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3. Simplify each of the following:

(a)  $\frac{3a-5}{3} - \frac{a-1}{2}$

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(b)  $\frac{b-1}{4} + \frac{b-2}{3} + \frac{b-5}{2}$

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(c)  $\frac{x+y-4}{2} - \frac{x-y-2}{3}$

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4. The bearing of R from Q is  $043^\circ$ , the bearing of R from S is  $288^\circ$  and the bearing of S from Q is  $068^\circ$ . Find the size of:

(a)  $\angle RQS$

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(b)  $\angle QRS$

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(c)  $\angle RSQ$

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5. Charles is standing at point A, 72 m away from the front door of a building. From this point, the angle of elevation of the top of the building is  $75^\circ$ .

(a) Find the height of the building, correct to 1 decimal point.

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- (b) Charles walks 104 m further away from the building to a point b such that b, A and the front door of the building are in a straight line. Find the angle of elevation of the top of the building, correct to the nearest degree.

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6. The bearing of a ship F from a lighthouse L is  $320^\circ$ , while the bearing of a second ship G from the same lighthouse is  $285^\circ$ . Both ships are due north of an oil rig H, which is 15.2 nautical miles due west of the lighthouse. Find the distance between the ships, correct to the nearest nautical mile.

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