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

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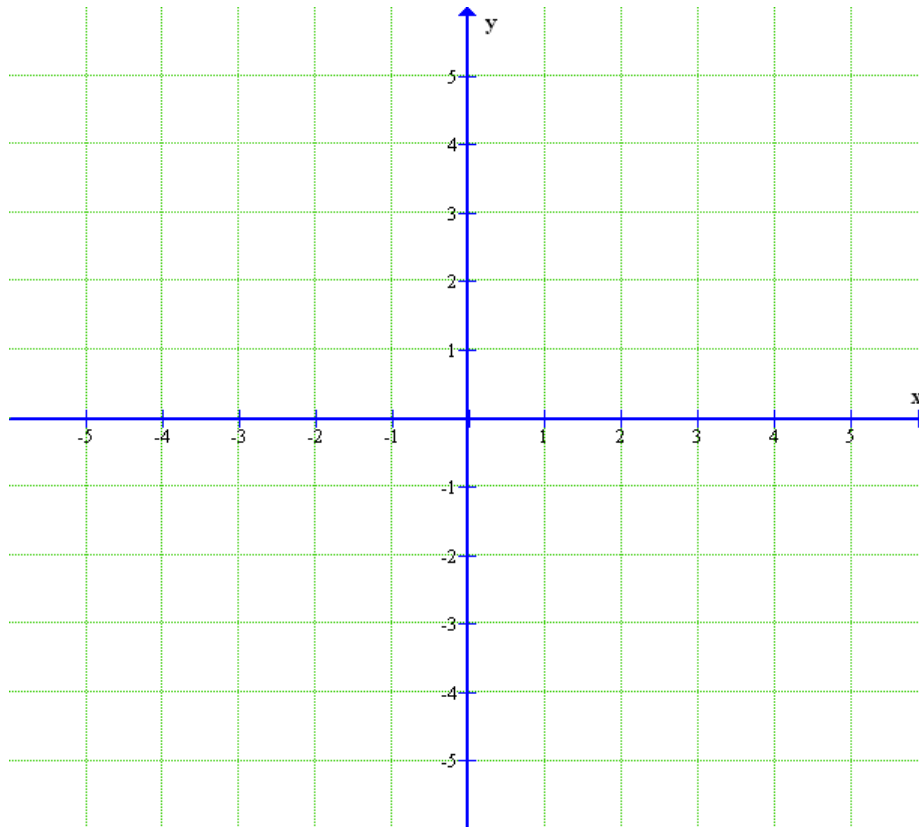
# 4 Year 8 Term 4 Week 4 Homework

## 4.1 Linear Relationships

### 4.1.1 The number plane

#### Exercise 4.1.1

1. Plot the points  $A(-1, 4)$   $B(5, 4)$ ,  $C(5, -2)$  and  $D(-1, -2)$  on a number plane and join them to form a quadrilateral.



2. What kind of quadrilateral is  $ABCD$ ?

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3. Find the perimeter and area of  $ABCD$ ?

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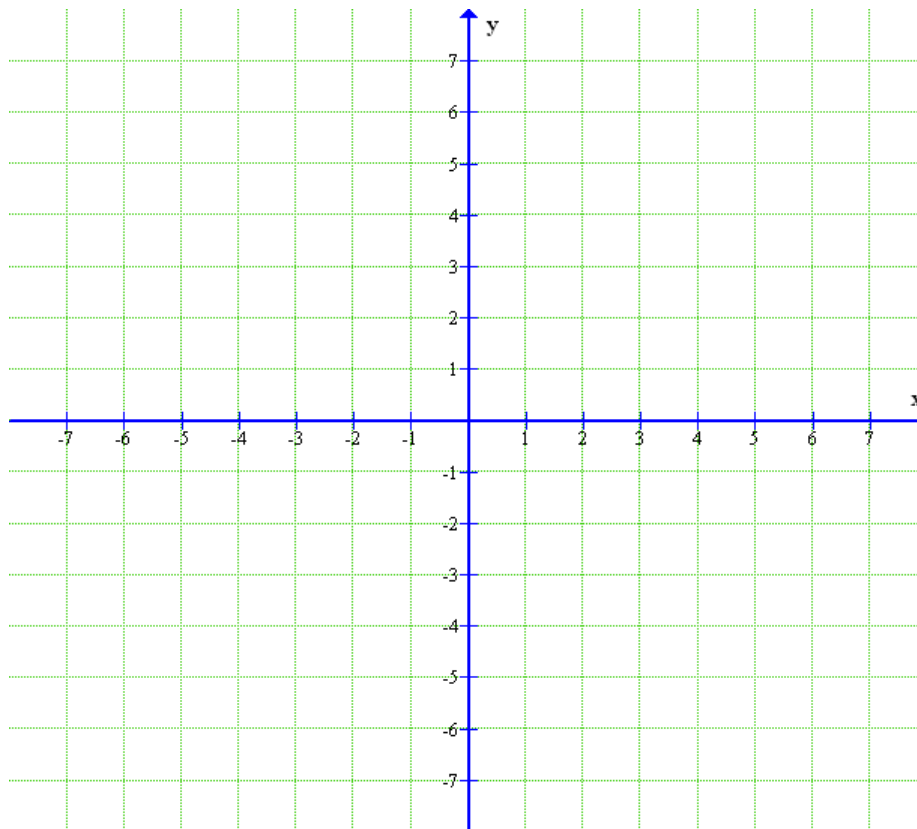
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**Exercise 4.1.2 Write down the co-ordinates of the point that is:**

1. 8 units to the right of  $(-2, -2)$  \_\_\_\_\_
2. 5 unit above  $(-2, -2)$  \_\_\_\_\_
3. 6 unit to the left of  $(4, 1)$  \_\_\_\_\_

**Exercise 4.1.3 Further applications**

1. Plot the points  $P(4, 6)$ ,  $Q(4, -2)$ , and  $R(-2, -2)$  on a number plane.



2. Find the co-ordinates of the point  $S$  such that  $PQRS$  is a rectangle.

\_\_\_\_\_

\_\_\_\_\_

3. Join the diagonals and write down the co-ordinate of their point of intersection.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**4.1.2 Straight line graphs**

**Exercise 4.1.4 Use a table of values to draw the graph of each of these equations on the same number plane.**

1.  $y = -\frac{2}{3}x + 5$

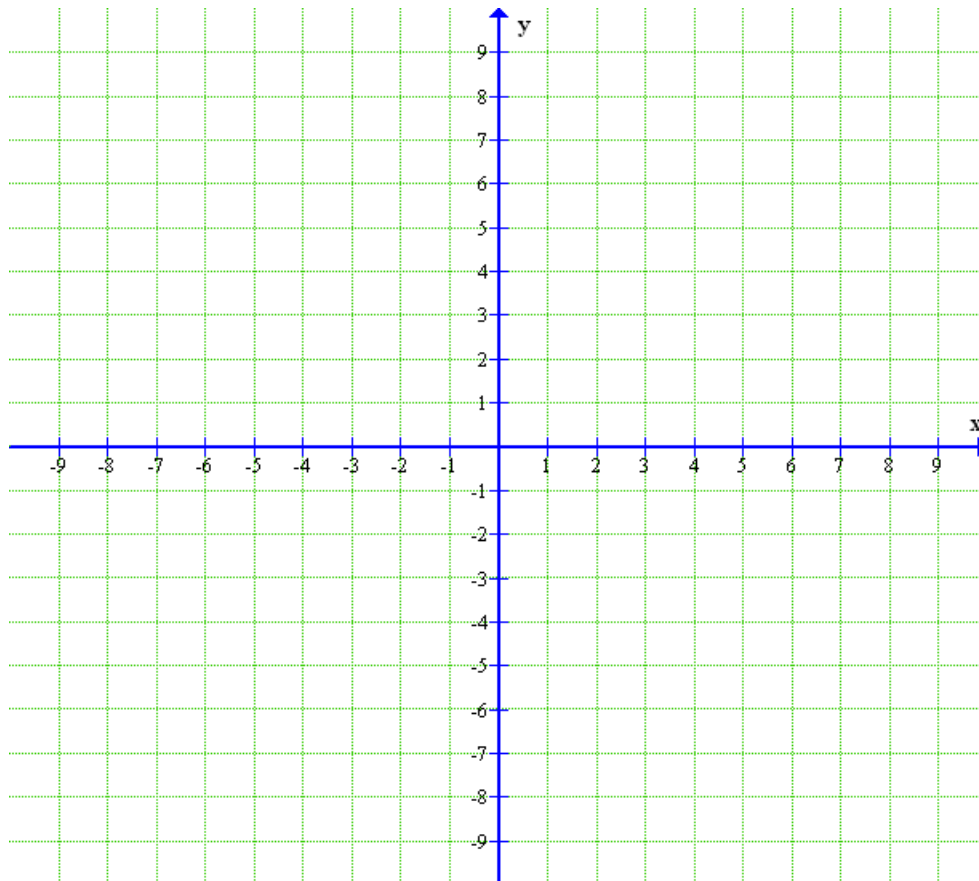
|     |  |  |  |  |
|-----|--|--|--|--|
| $x$ |  |  |  |  |
| $y$ |  |  |  |  |

2.  $y = 3x - 4$

|     |  |  |  |  |
|-----|--|--|--|--|
| $x$ |  |  |  |  |
| $y$ |  |  |  |  |

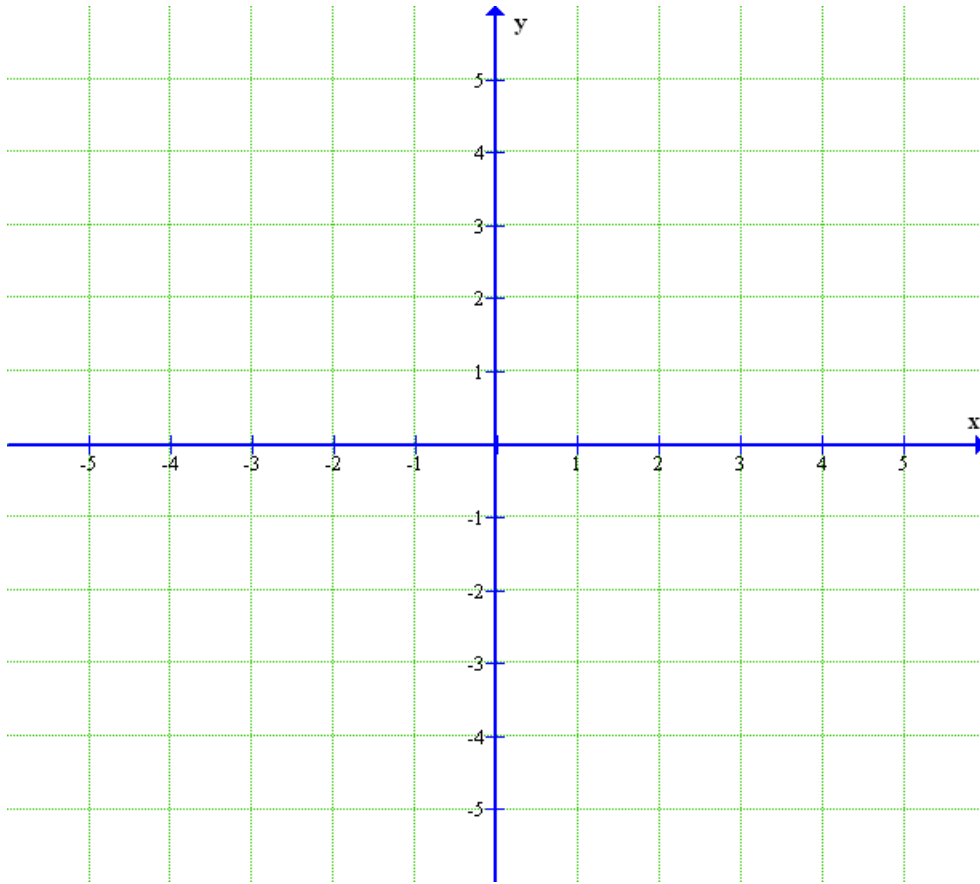
3.  $y = -5 - 2x$

|     |  |  |  |  |
|-----|--|--|--|--|
| $x$ |  |  |  |  |
| $y$ |  |  |  |  |



**Exercise 4.1.5 Graph the lines:**

$y = x - 4, \quad y = 4 - x, \quad y = x + 4, \quad y = -x - 4$



1. What shape is enclosed by these four lines?

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2. What are the points of intersection?

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3. What is the area of the shape in  $unit^2$ ?

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**4.1.3 Linear equations**

**Exercise 4.1.6 Determine the equation of the line that passes through the points in each table:**

1. 

|     |    |    |   |   |   |
|-----|----|----|---|---|---|
| $x$ | -2 | -1 | 0 | 1 | 2 |
| $y$ | 4  | 3  | 2 | 1 | 0 |

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2. 

|     |    |    |   |   |    |
|-----|----|----|---|---|----|
| $x$ | -2 | -1 | 0 | 1 | 2  |
| $y$ | 8  | 5  | 2 | 1 | -4 |

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**4.1.4 Horizontal and vertical lines**

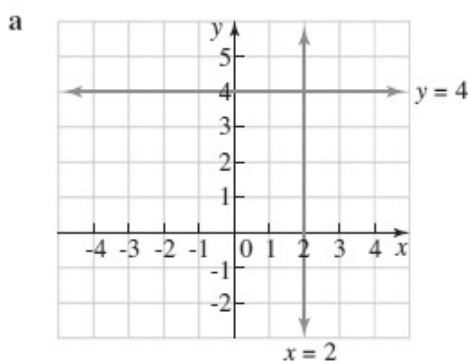
- $x = a$  is the equation of a vertical line cutting the x-axis at **a**.
- $y = b$  is the equation of a horizontal line cutting the y-axis at **b**.

**Example 4.1.1**

**a** Sketch the line  $x = 2$  and  $y = 4$  on the same number plane.

**b** What is the point of intersection of these lines?

**solution:**



**b** The point of intersection is (2, 4).

### 4.1.5 Intersection of lines

To find the point of intersection of two lines:

- graph the lines on the same number plane
- read off the co-ordinates of their point of intersection.

To graph a line using the intercepts method:

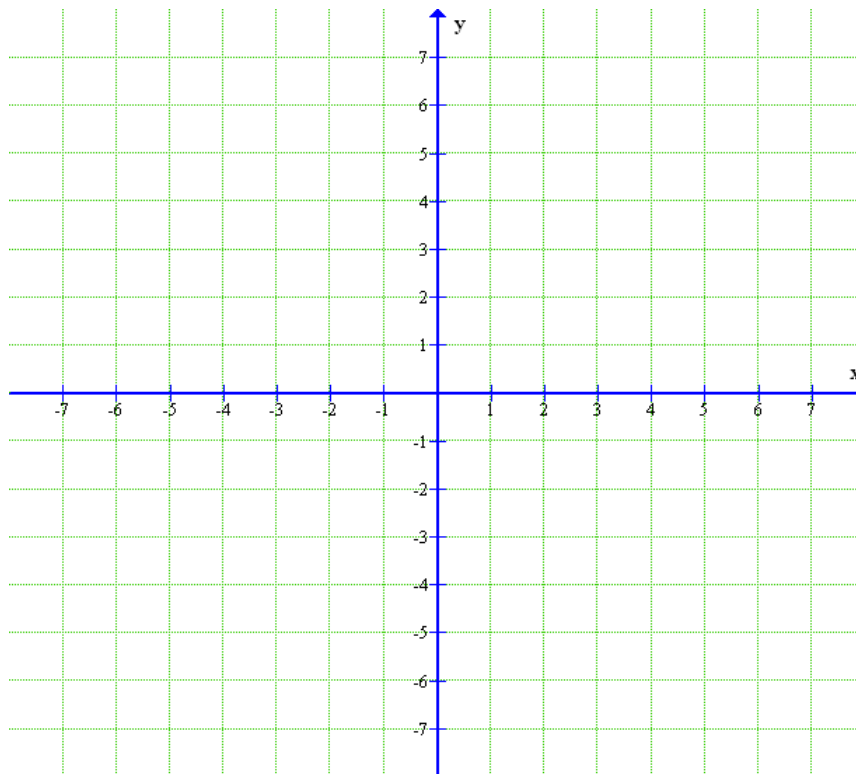
- substitute  $x = 0$  into the equation to find y-intercept
- substitute  $y = 0$  into the equation to find the x-intercept
- draw a line through the two intercepts.

### Exercise 4.1.7

1. Use the intercept method to graph the lines  $y = 2x$  and  $y = x + 3$  on the same number plane.

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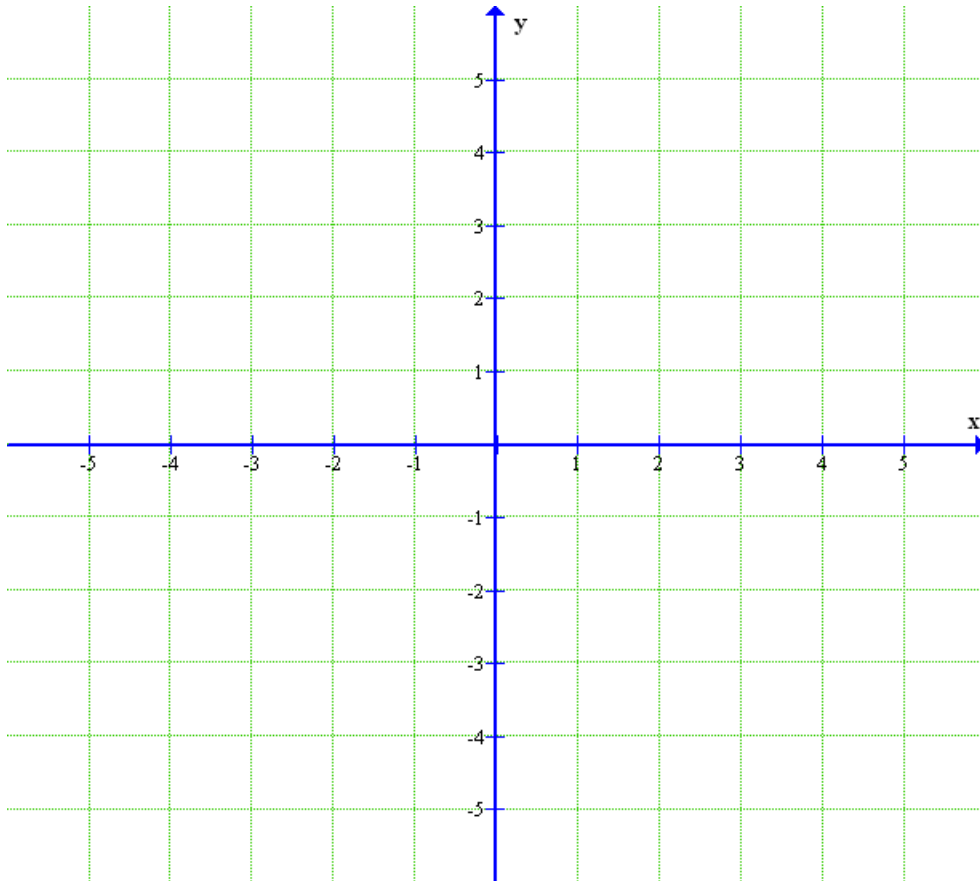


2. Write down the point of intersection of these lines. \_\_\_\_\_

## 4.2 Miscellaneous Exercise

### Exercise 4.2.1

1. On a number plane, graph the coordinates  $(2, 2)$ ,  $(2, 1)$ ,  $(3, 0)$ ,  $(3, 4)$ ,  $(1, -2)$  and  $(4, 3)$ .



- (a) Which three points lie on a straight line?

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- (b) What is the equation of the line?

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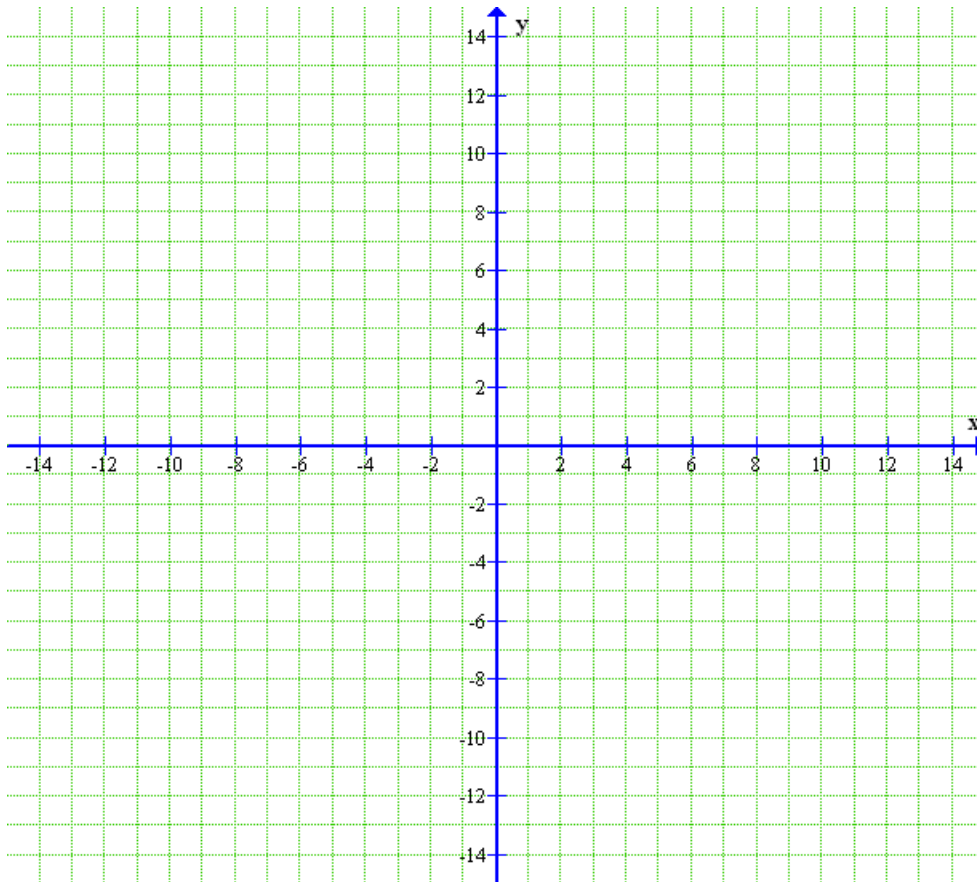
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2. What is the area of the triangle enclosed by the lines  $y = 3x + 5$ ,  $y = 2x - 1$  and  $y = 2$  ?




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3. Lines that all intersect at the same point are said to be concurrent. Show by substitution that lines  $y = \frac{1}{2}x - 7$ ,  $y = 5 - x$  and  $2x - 3y - 25 = 0$  are concurrent.

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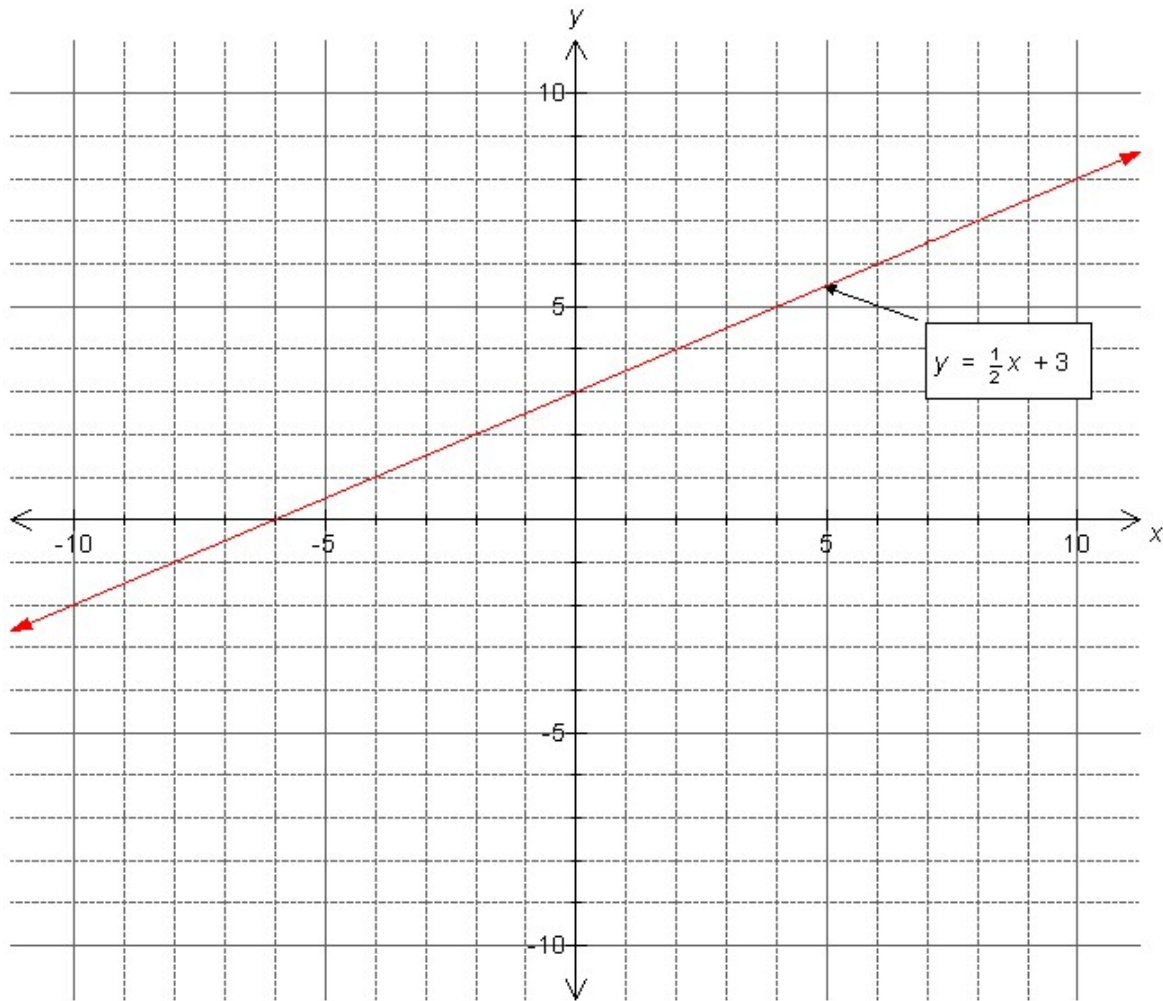


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### 4.3 Maths Challenge

#### Exercise 4.3.1

1. On the number plane below is drawn the graph of  $y = \frac{1}{2}x + 3$ . A and B are two points on the line. A is the point of intersection of the line and  $x = -3$ , and B is the point of intersection of the line and  $x = 4$ . Find the length of the interval AB, correct to 1 decimal place.




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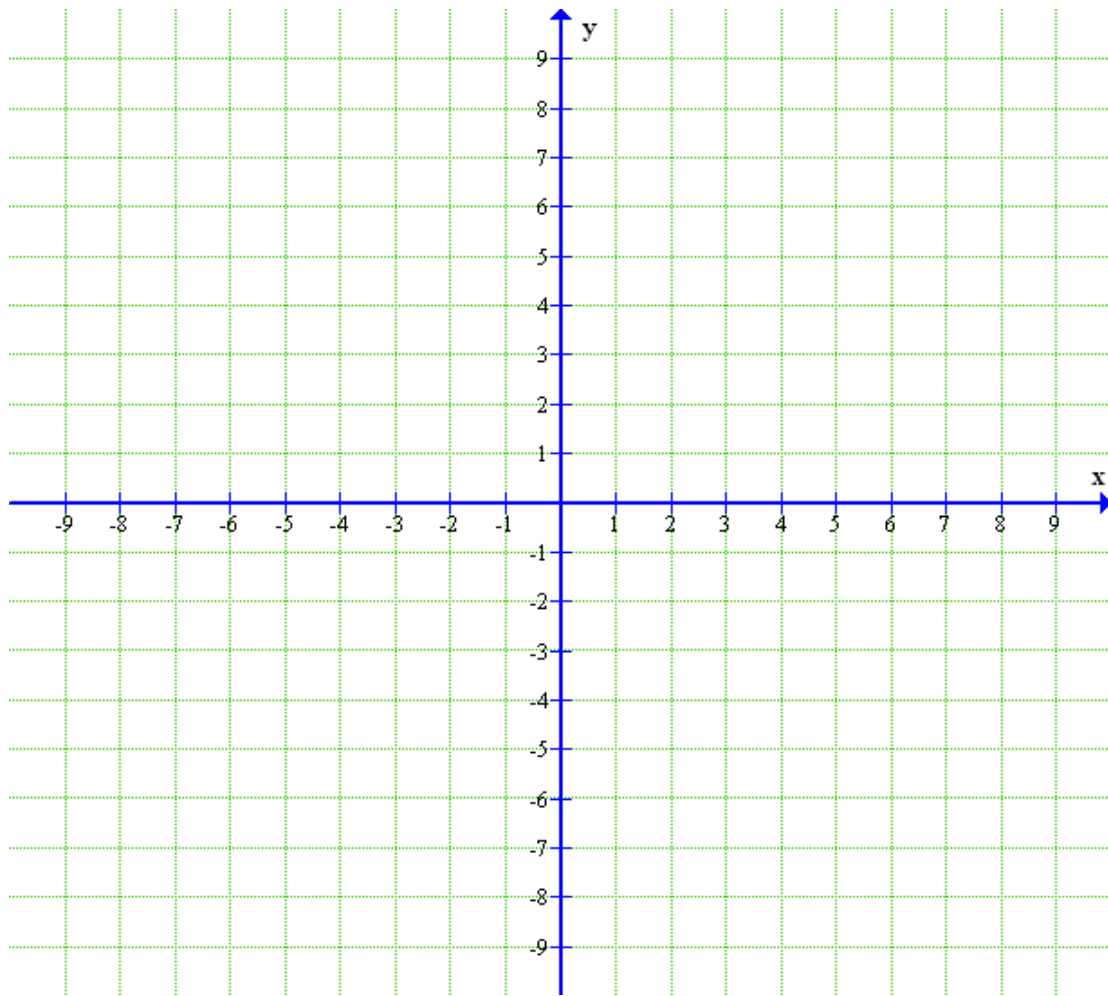


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2. What is the perimeter of the triangle enclosed by the lines  $y = 5 - 2x$ ,  $y = 4x - 7$  and  $y = 5$ ?  
Answer correct to 1 decimal place.



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