

Student Name: _____	Grade: _____
Date: _____	Score: _____

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This edition was printed on November 24, 2008.

Camera ready copy was prepared with the **LaTeX2e** typesetting system.

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6 Year 9 Term 4 Week 6 Homework

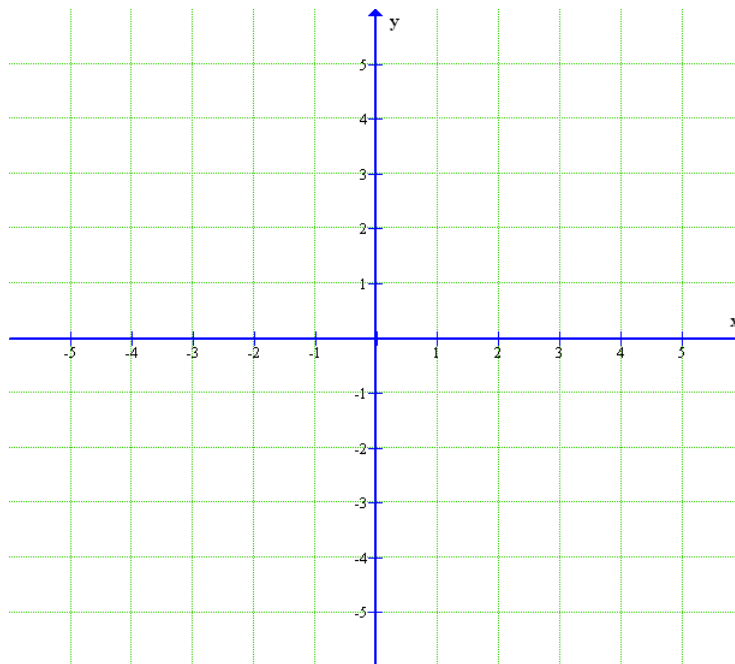
6.1 Co-ordinate geometry

6.1.1 The distance between two points

Exercise 6.1.1

1. $A(3, 3)$, $B(2, -1)$ and $C(-2, 0)$ are the three vertices of a triangle.

(a) Plot the point A , B and C on the number plane.



(b) Prove that $AC^2 = AB^2 + BC^2$.

(c) Calculate the area of the $\triangle ABC$.

(d) Show that $\triangle ABC$ is also isosceles.

2. Use the distance formula to calculate the length AB , correct to 2 decimal places, given that:

(a) $A(2, -1), B(4, 1)$

(b) $A(0, 4), B(-3, 7)$

(c) $A(4, 1), B(3, -1)$

6.1.2 The midpoint of an interval

Exercise 6.1.2

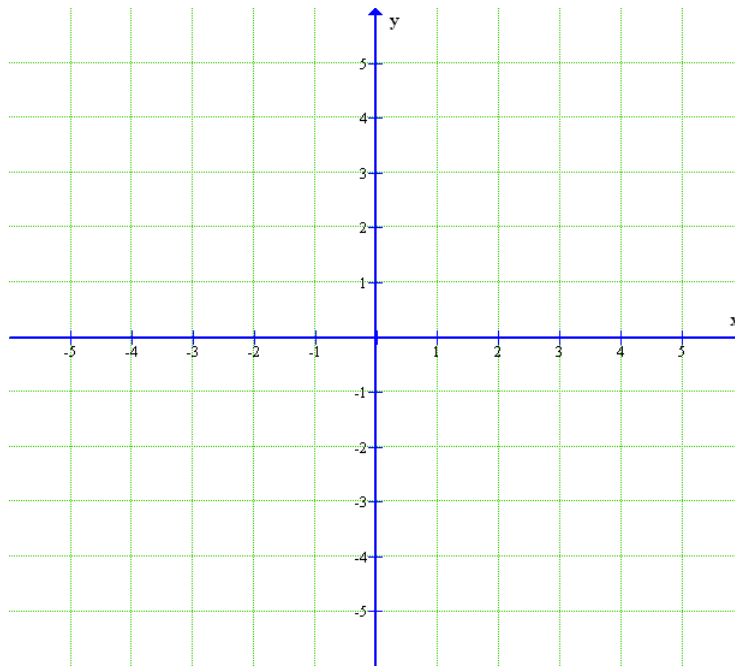
1. Find the midpoint of the interval PQ given that:

(a) $P(7, -2), Q(-3, 2)$

(b) $P(-4, 2), Q(1, -4)$

(c) $P(2, -1), Q(4, -3)$

2. Plot the points $A(-2, 4)$, $B(4, 2)$ and $C(0, -2)$ on the number plane. Show that:



(a) $\triangle ABC$ is a isosceles.

(b) the gradient of AB is $-\frac{1}{3}$.

(c) the midpoint of AC is $(-1, 1)$.

(d) the line joining the midpoints of AC and BC is parallel to the side AB and half its length.

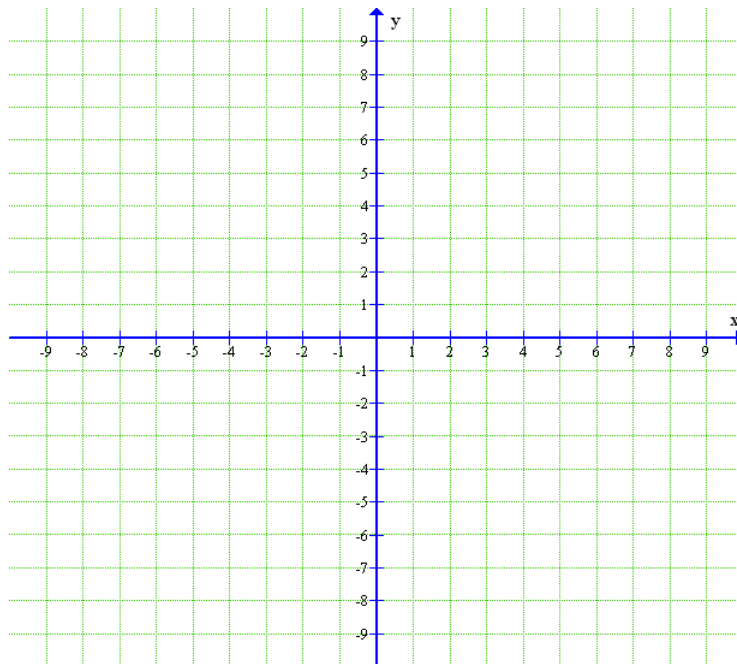
6.1.3 The gradient formula**Exercise 6.1.3 Find the gradient of the line which passes through the given points,****using** $m = \frac{y_2 - y_1}{x_2 - x_1}$.

1. $A(-3, 7)$ and $B(-4, 2)$

2. $C(-4, -6)$ and $D(-1, -2)$

Exercise 6.1.4

1. The lines $x = 2$ and $y = -9$ intersect at R while the lines $x = -1$ and $y = 3$ intersect at S . Find the gradient of the line RS .



2. The gradient of a line which passes through the points $A(14, -5)$ and $B(11, p)$ is -4 . Find the value of p .

6.1.4 General form of the equation of a line

The equation of a straight line in general form is:

$$ax + by + c = 0, \text{ where } a, b \text{ and } c \text{ are integers and } a > 0.$$

Exercise 6.1.5 Write each of these equations in the general form:

1. $y = 2x - 6$

2. $3x - y = -12$

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

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

Exercise 6.1.6 Write each of these equations in the gradient-intercept form:

1. $5x + 5y - 2 = 0$

2. $x - 9y - 6 = 0$

3. $3x + 5y - 10 = 0$

6.1.5 The equation of a line given by the gradient and a point

The equation of the straight line that passes through the point (x_1, y_1) with gradient is given by:

$$y - y_1 = m(x - x_1)$$

Exercise 6.1.7 Use the point-gradient formula to find the equation of the line that passes through the given point with the given gradient. Give your answer in the gradient-intercept form.

1. $(-2, 1), m = 1\frac{1}{3}$

2. $(\frac{1}{2}, -2), m = -2$

3. $(-\frac{1}{2}, 5), m = 4$

Exercise 6.1.8 For each of the following, find the gradient of the line that passes through the given points and use the point and gradient form $y - y_1 = m(x - x_1)$ to find the equation.

1. $(1, 4)$ and $(-2, 13)$

2. $(1, 7)$ and $(2, 0)$

3. $(1, -5), (-1, -5)$

6.1.6 The equation of a line given by two points

The equation of the straight line that passes through the points (x_1, y_1) and (x_2, y_2) is given by:

$$\frac{y-y_1}{x-x_1} = \frac{y_2-y_1}{x_2-x_1}$$

Example 6.1.1 Use the two-point formula to find the equation of the line that passes through the points $(-3, 6)$ and $(4, -1)$.

Solution: Let $(-2, 6)$ be (x_1, y_1) and $(4, -1)$ be (x_2, y_2) .

$$\frac{y-y_1}{x-x_1} = \frac{y_2-y_1}{x_2-x_1}$$

$$\frac{y-6}{x-(-3)} = \frac{-1-6}{4-(-3)}$$

$$\frac{y-6}{x+3} = \frac{-7}{7}$$

$$\frac{y-6}{x+3} = -1$$

$$y - 6 = -1(x + 3)$$

$$y - 6 = -x - 3$$

$$y + x - 3 = 0$$

Exercise 6.1.9 Use the two-point formula to find the equation of the line that passes through the given points:

1. $(2, 5)$ and $(6, 9)$

2. $(-1, -6)$ and $(3, 14)$

3. $(-1, 5)$ and $(2, -3)$

Exercise 6.1.10 For each of the following, find the gradient of the line that passes through the given points and hence find the equation of the line by substituting the gradient and one point into $y - y_1 = m(x - x_1)$.

1. $(-2, 13)$ and $(1, 4)$

2. $(8, 4)$ and $(6, 5)$

3. $(-1, -5)$ and $(2, -3)$

4. $(1, 0)$ and $(-3, 4)$

Exercise 6.1.11 Use the two-point formula to find the equation of the line that passes through each pair of points. Give your answer in the general form.

1. $(-5, 16)$ and $(3, 10)$

2. $(-8, -9)$ and $(4, 0)$

3. $(0, 3)$ and $(1, -2)$

4. $(1, 5)$ and $(-2, -4)$

Exercise 6.1.12

1. Determine, in the general form, the equation of the line that passes through the points $L(1, -9)$ and $M(-3, -1)$.

2. Find the x -intercept and y -intercepts of the line.

Exercise 6.1.13

1. Find the equation of the line passing through the points $A(-3, 3)$ and $B(5, -13)$.

2. Show that $C(-2, 1)$ lies in the line AB .

3. What can you thus say about the points A , B and C ?
