Revision - Straight Line Graphs

Exercise A

Work out the gradient of the line joining these pairs of points:

a (4, 2), (6, 3)
b (−1, 3), (5, 4)
c (−4, 5), (1, 2)
d (2, −3), (6, 5)
e (−3, 4), (7, −6)
f (−12, 3), (−2, 8)

Exercise B

1. Find the gradient and y-intercept of each of the following lines.

a $y = -x + 4$
b $y = 2x - 5$
c $y = \frac{1}{2}x - \frac{2}{3}$
d $y = -3x$
e $y = \frac{6}{7}x + \frac{7}{5}$
f $y = 2 - 7x$
g $3x - 4y + 8 = 0$
h $4x - 5y - 10 = 0$
i $-2x + y - 9 = 0$
j $7x + 4y + 12 = 0$
k $7x - 2y + 3 = 0$
l $-5x + 4y + 2 = 0$

2. A line is parallel to the line $3x + 6y + 11 = 0$ and its intercept on the y-axis is $(0, 7)$. Write down the equation of the line.

3. The line $3x + 2y - 5 = 0$ meets the x-axis at the point R. Work out the coordinates of R.

4. The line $5x - 4y + 20 = 0$ meets the y-axis at the point A and the x-axis at the point B. Work out the coordinates of the points A and B.

Exercise C

1 Find the equation of the line with gradient m that passes through the point (x_1, y_1) when:

a $m = 2$ and $(x_1, y_1) = (2, 5)$
b $m = 3$ and $(x_1, y_1) = (-2, 1)$
c $m = -1$ and $(x_1, y_1) = (3, -6)$
d $m = -4$ and $(x_1, y_1) = (-2, -3)$
e $m = \frac{1}{2}$ and $(x_1, y_1) = (-4, 10)$
f $m = -\frac{2}{3}$ and $(x_1, y_1) = (-6, -1)$
g $m = 2$ and $(x_1, y_1) = (a, 2a)$
h $m = -\frac{1}{2}$ and $(x_1, y_1) = (-2b, 3b)$

2 The line $y = 4x - 8$ meets the x-axis at the point A. Find the equation of the line with gradient 3 that passes through the point A.

3 The line $y = -2x + 8$ meets the y-axis at the point B. Find the equation of the line with gradient 2 that passes through the point B.

4 The line $y = \frac{1}{2}x + 6$ meets the x-axis at the point C. Find the equation of the line with gradient $\frac{2}{3}$ that passes through the point C. Write your answer in the form $ax + by + c = 0$, where a, b and c are integers.

5 The line $y = \frac{1}{4}x + 2$ meets the y-axis at the point B. The point C has coordinates $(-5, 3)$. Find the gradient of the line joining the points B and C.

6 The lines $y = x$ and $y = 2x - 5$ intersect at the point A. Find the equation of the line with gradient $\frac{2}{5}$ that passes through the point A. (Hint: Solve $y = x$ and $y = 2x - 5$ simultaneously.)

7 The lines $y = 4x - 10$ and $y = x - 1$ intersect at the point T. Find the equation of the line with gradient $-\frac{2}{3}$ that passes through the point T. Write your answer in the form $ax + by + c = 0$, where a, b and c are integers.

8 The line p has gradient $\frac{2}{3}$ and passes through the point $(6, -12)$. The line q has gradient -1 and passes through the point $(5, 5)$. The line p meets the y-axis at A and the line q meets the x-axis at B. Work out the gradient of the line joining the points A and B.

Exercise D

1 Find the equation of the line that passes through these pairs of points:

a $(2, 4)$ and $(3, 8)$

b $(0, 2)$ and $(3, 5)$

c $(-2, 0)$ and $(2, 8)$

d $(5, -3)$ and $(7, 5)$

2 The line that passes through the points $(2, -5)$ and $(-7, 4)$ meets the x-axis at the point P. Work out the coordinates of the point P.

3 The line that passes through the points $(-3, -5)$ and $(4, 9)$ meets the y-axis at the point G. Work out the coordinates of the point G.

4 The line that passes through the points $(3, 2\frac{1}{2})$ and $(-1\frac{1}{2}, 4)$ meets the y-axis at the point J. Work out the coordinates of the point J.

5 The line $y = 2x - 10$ meets the x-axis at the point A. The line $y = -2x + 4$ meets the y-axis at the point B. Find the equation of the line joining the points A and B. (Hint: First work out the coordinates of the points A and B.)

6 The line $y = 4x + 5$ meets the y-axis at the point C. The line $y = -3x - 15$ meets the x-axis at the point D. Find the equation of the line joining the points C and D. Write your answer in the form $ax + by + c = 0$, where a, b and c are integers.

7 The lines $y = x - 5$ and $y = 3x - 13$ intersect at the point S. The point T has coordinates $(-4, 2)$. Find the equation of the line that passes through the points S and T.

8 The lines $y = -2x + 1$ and $y = x + 7$ intersect at the point L. The point M has coordinates $(-3, 1)$. Find the equation of the line that passes through the points L and M.

9 The vertices of the triangle ABC have coordinates $A(3, 5)$, $B(-2, 0)$ and $C(4, -1)$. Find the equations of the sides of the triangle.

10 The line V passes through the points $(-5, 3)$ and $(7, -3)$ and the line W passes through the points $(2, -4)$ and $(4, 2)$. The lines V and W intersect at the point A. Work out the coordinates of the point A.

Exercise E

1.

Find an equation of the line:

a parallel to the line $y = -2x - 5$, passing through $(-\frac{1}{2}, \frac{3}{2})$

b parallel to the line $x - 2y - 1 = 0$, passing through $(0, 0)$

c perpendicular to the line $y = x - 4$, passing through $(-1, -2)$

d perpendicular to the line $2x + y - 9 = 0$, passing through $(4, -6)$.

2.

Find an equation of the line:

a parallel to the line $y = 3x + 6$, passing through $(-2, 5)$

b perpendicular to the line $y = 3x + 6$, passing through $(-2, 5)$

c parallel to the line $4x - 6y + 7 = 0$, passing through $(3, 4)$

d perpendicular to the line $4x - 6y + 7 = 0$, passing through $(3, 4)$.

3.

The line r passes through the points $(1, 4)$ and $(6, 8)$ and the line s passes through the points $(5, -3)$ and $(20, 9)$. Show that the lines r and s are parallel.

4.

The vertices of a quadrilateral $ABCD$ has coordinates $A(-1, 5)$, $B(7, 1)$, $C(5, -3)$, $D(-3, 1)$. Show that the quadrilateral is a rectangle.