

# Coordinate Geometry Worksheet 1

1. Find the gradient between the following points:

(a) (3, 8) and (5, 11).

$\frac{3}{2}$

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

$-3$

(c)  $(\frac{1}{2}, 2)$  and  $(\frac{5}{2}, 4)$ .

$1$

(d) (1, 7) and (4, -3).

$-\frac{10}{3}$

(e) (9,  $a$ ) and (7, -3).

$\frac{a+3}{2}$

2. Find the value of the variable in the following:

(a) Gradient between (3, 8) and ( $a$ , 9) is 3.

$a = \frac{10}{3}$

(b) Gradient between (2,  $b$ ) and (-7, 8) is  $\frac{1}{2}$ .

(c) Gradient between  $(\frac{1}{2}, c + 1)$  and  $(\frac{2}{3}, -1)$  is  $\frac{2}{3}$ .

3. Find the intersection of the following pairs of lines:

(a)  $y = 3x - 2$  and  $y = -2x - 1$ .

(b)  $2x + 5y = 10$  and  $y = 2x + 8$ .

(c)  $4x - 3y = 0$  and  $2x + y = 1$ .

(d)  $6x + 5y = 7$  and  $4x - 3y = 1$ .

4. Find the gradient of the line:

(a)  $7x - 2y + 10 = 0$ .

(b)  $ax - by = 7$ .

5. Find the gradient of the line perpendicular to:

(a)  $y = \frac{1}{2}x + 3$ .

(b)  $2x + 5y = 0$ .

(c)  $px + qy = r$ .

6. Find the equation (in the form  $ax + by = c$ ) of the following lines:

(a) Gradient 2 through the point  $(\frac{2}{3}, 5)$ .

(b) Gradient  $-\frac{2}{3}$  through the point (3, 2).

(c) Through the points (3, 2) and (9, -1).

(d) Through the points  $(\frac{1}{3}, -\frac{1}{2})$  and  $(-\frac{1}{4}, \frac{2}{3})$ .

(e) \* Through the points (0,  $a$ ) and ( $b$ , 0).

7. Find the equation of the perpendicular bisector to the points (1, 3) and (2, -7) in the form  $ax + by = c$ .

8. Find the equation of the line parallel to  $2x - 9y = 1$  through (2, -3) in the form  $ax + by = c$ .

9. Find the equation of the line perpendicular to  $7x - y = 1$  through (8, 1) in the form  $ax + by = c$ . Also find where this line crosses the  $y$ -axis and the  $x$ -axis.

10.  $A = (7, 4)$ .  $B = (2, 0)$ .  $C = (2, t)$ . Given that  $BC = AC$ , find  $t$ .

11. ★ Find the equation of the line perpendicular to  $x + ay = 1$  through the point  $(a, 0)$ . Give your answer in the form  $y = mx + c$  (where  $m$  and  $c$  are to be given in terms of  $a$ ).    □
12. ★★ A triangle is bounded by the lines whose equations are  $y = -x - 1$ ,  $y = 2x - 1$  and  $y = k$ , where  $k$  is a positive integer.

For what values of  $k$  is the area of the triangle less than 2008? (You may need trial and improvement here...)