C1 COORDINATE GEOMETRY *Worksheet D*

1 The straight line l has the equation $y = 1 - 2x$.

The straight line m is perpendicular to l and passes through the point with coordinates $(6, -1)$.

a Find the equation of m in the form $ax + by + c = 0$, where a, b and c are integers. **(4)**

b Find the coordinates of the point where l and m intersect. **(3)**

2 The straight line l passes through the point A $(1, -3)$ and the point B $(7, 5)$.

a Find an equation of line l. **(3)**

The line m has the equation $4x + y - 17 = 0$ and intersects l at the point C.

b Show that C is the mid-point of AB. **(4)**

c Show that the straight line perpendicular to m which passes through the point C also passes through the origin. **(4)**

3 The point A has coordinates $(-2, 7)$ and the point B has coordinates $(4, p)$.

The point M is the mid-point of AB and has coordinates $(q, \frac{9}{2})$.

a Find the values of the constants p and q. **(3)**

b Find the equation of the straight line perpendicular to AB which passes through the point A. Give your answer in the form $ax + by + c = 0$, where a, b and c are integers. **(5)**

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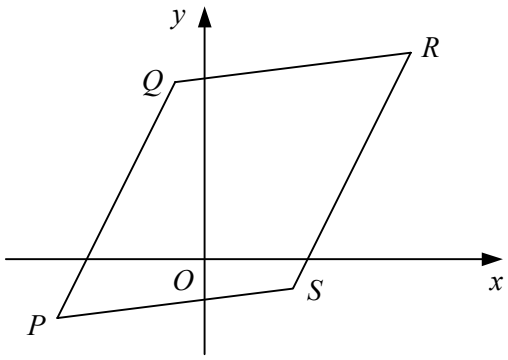

The points P $(-5, -2)$, Q $(-1, 6)$, R $(7, 7)$ and S $(3, -1)$ are the vertices of a parallelogram as shown in the diagram above.

a Find the length of PQ in the form $k\sqrt{5}$, where k is an integer to be found. **(3)**

b Find the coordinates of the point M, the mid-point of PQ. **(2)**

c Show that MS is perpendicular to PQ. **(4)**

d Find the area of parallelogram $PQRS$. **(4)**

5 The straight line l is parallel to the line $2x - y + 4 = 0$ and passes through the point with coordinates $(-1, -3)$.

a Find an equation of line l. **(3)**

The straight line m is perpendicular to the line $6x + 5y - 2 = 0$ and passes through the point with coordinates $(4, 4)$.

b Find the equation of line m in the form $ax + by + c = 0$, where a, b and c are integers. **(5)**

c Find, as exact fractions, the coordinates of the point where lines l and m intersect. **(3)**

6 The straight line l has gradient $\frac{1}{2}$ and passes through the point with coordinates (2, 4).

a Find the equation of l in the form $ax + by + c = 0$, where a, b and c are integers. **(3)**

The straight line m has the equation $y = 2x - 6$.

b Find the coordinates of the point where line m intersects line l. **(3)**

c Show that the quadrilateral enclosed by line l, line m and the positive coordinate axes is a kite. **(4)**

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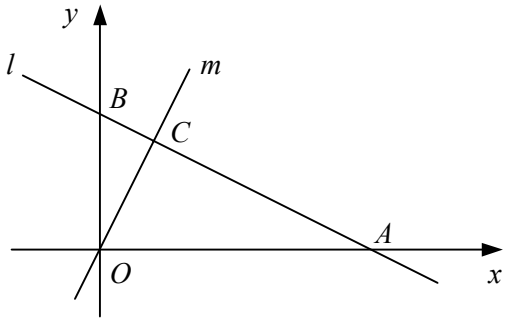

The diagram shows the straight line l with equation $x + 2y - 20 = 0$ and the straight line m which is perpendicular to l and passes through the origin O.

a Find the coordinates of the points A and B where l meets the x-axis and y-axis respectively. **(2)**

Given that l and m intersect at the point C,

b find the ratio of the area of triangle OAC to the area of triangle OBC. **(5)**

8 The straight line p has the equation $6x + 8y + 3 = 0$.

The straight line q is parallel to p and crosses the y-axis at the point with coordinates (0, 7).

a Find the equation of q in the form $y = mx + c$. **(2)**

The straight line r is perpendicular to p and crosses the x-axis at the point with coordinates (1, 0).

b Find the equation of r in the form $ax + by + c = 0$, where a, b and c are integers. **(4)**

c Show that the point where lines q and r intersect lies on the line $y = x$. **(4)**

9 The vertices of a triangle are the points P (3, c), Q (9, 2) and R (3c, 11) where c is a constant.

Given that $\angle PQR = 90°$,

a find the value of c, **(5)**

b show that the length of PQ is $k\sqrt{10}$, where k is an integer to be found, **(3)**

c find the area of triangle PQR. **(4)**

10 The straight line l_1 passes through the point P (1, 3) and the point Q (13, 12).

a Find the length of PQ. **(2)**

b Find the equation of l_1 in the form $ax + by + c = 0$, where a, b and c are integers. **(4)**

The straight line l_2 is perpendicular to l_1 and passes through the point R (2, 10).

c Find an equation of line l_2. **(3)**

d Find the coordinates of the point where lines l_1 and l_2 intersect. **(3)**

e Find the area of triangle PQR. **(3)**