Name:

Section:

Coordinate Geometry Worksheet

1 P is the point $(-2, 1)$ and Q is the point $(6, 13)$.
M is the midpoint of the line PQ.

(a) Find the coordinates of M.

(..... , ...) [1]

(b) **(i)** Find the gradient of the line PQ.

..... [2]

(ii) Write down the gradient of a line that is perpendicular to the line PQ.

..... [1]

2 D is the point (4, 6) and E is the point (e, e).

(a) The length of DE is $\sqrt{20}$.

Form an equation in e and solve it to find the possible coordinates of E.
Show your working.

(..... , ...) or (..... , ...) [5]

(b) F is the point $(-f, 5f)$.

The gradient of the perpendicular bisector of DF is $\frac{3}{2}$.

(i) Find the value of f.

$f =$ ..... [4]

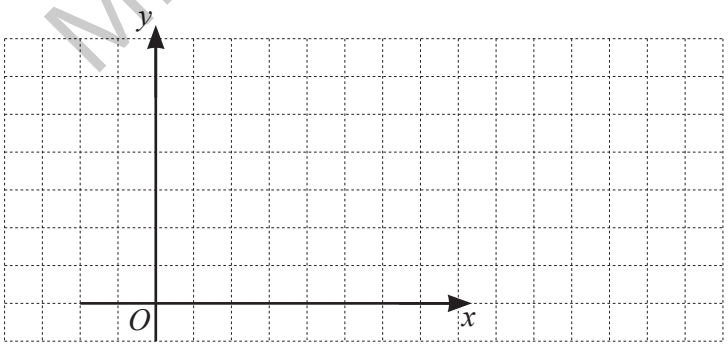
(ii) The equation of the perpendicular bisector of DF is $2y = 3x + k$.

Find the value of k.

$k =$ ..... [3]

3 **(a)** PQR is an isosceles triangle with $PR = QR$.
P is the point (1, 5) and Q is the point (5, 1).
Angle PRQ is **not** a right angle.

Find the coordinates for one possible position of R.
You may use the grid to help you.



(..... , ...) [2]

(b) A is the point $(-1, -5)$ and B is the point $(3, 3)$.

Find the equation of the line perpendicular to AB which passes through the midpoint of AB.

..... [5]

4 P is the point $(h, 7)$.
P lies on the line $3y + 2x = 5$.

(a) Find the value of h.

$h =$ ..... [2]

(b) Line L is perpendicular to the line $3y + 2x = 5$ and passes through P.

Find the equation of line L.

..... [4]

5 The vertices of a triangle are A (7, 0), B (−1, 6) and C (−1, −4).

(a) Show that $AB = BC$.

[3]

(b) Find the area of triangle ABC.

..... unit^2 [2]

6 P is the point (–3, 4), Q is the point (5, 1).

(a) M is the midpoint of PQ.

Find the coordinates of M.

Answer (..... , ...) [1]

(b) Find the gradient of PQ.

Answer ..... [1]

(c) R is the point $(-6, 0)$, O is the point $(0, 0)$.

Which of the points, R or P, is closer to O?
Show your working.

Answer point ..... [2]

7 A is the point $(-4, -1)$, B is the point $(2, 2)$ and $\overrightarrow{BC} = \begin{pmatrix} 4 \\ -8 \end{pmatrix}$.

(a) Find the coordinates of the midpoint of AB.

Answer (..... , ...) [1]

(b) Find the gradient of AB.

Answer ..... [1]

(c) Show that BC is perpendicular to AB.

[2]

8 The coordinates of P and M are $(-3, 10)$ and $(0, 4)$.

(a) Find the gradient of the line PM.

Answer ..... [1]

(b) Find the equation of the line PM.

Answer ..... [1]

(c) M is the midpoint of PQ.

Find the coordinates of Q.

Answer (..... , ...) [2]

9 A is the point (0, 3), B is the point (1, 5) and C is the point (p, –1).

(a) Find the equation of the line AB.

Answer ..... [2]

(b) The gradient of the line BC is $-\frac{3}{4}$.

Find the value of p.

Answer $p =$ ..... [2]

10 The coordinates of the midpoint of the line AB are (1, 2).
The length of the line AB is 10 units.

(a) If the gradient of AB is 0, find the coordinates of A and B.

Answer $A =$ (..... , ...)

$B =$ (..... , ...) [1]

(b) If the gradient of AB is $\frac{3}{4}$, find the coordinates of A and B.

Answer $A = (\ldots\ldots\ldots , \ldots\ldots\ldots)$

$B = (\ldots\ldots\ldots , \ldots\ldots\ldots)$ [2]

11 P is the point $(1, -3)$ and Q is the point $(7, 2)$.

(a) Find the coordinates of the midpoint of PQ.

Answer (..... , ...) [1]

(b) Find the gradient of the line PQ.

Answer ..... [1]

(c) The line, L, with equation $2x - 5y = k$, passes through the point Q.

(i) Find the value of k.

Answer $k =$ ..... [1]

(ii) The line $x + Ay = 3$ is parallel to L.

Find the value of A.

Answer A = ... [1]

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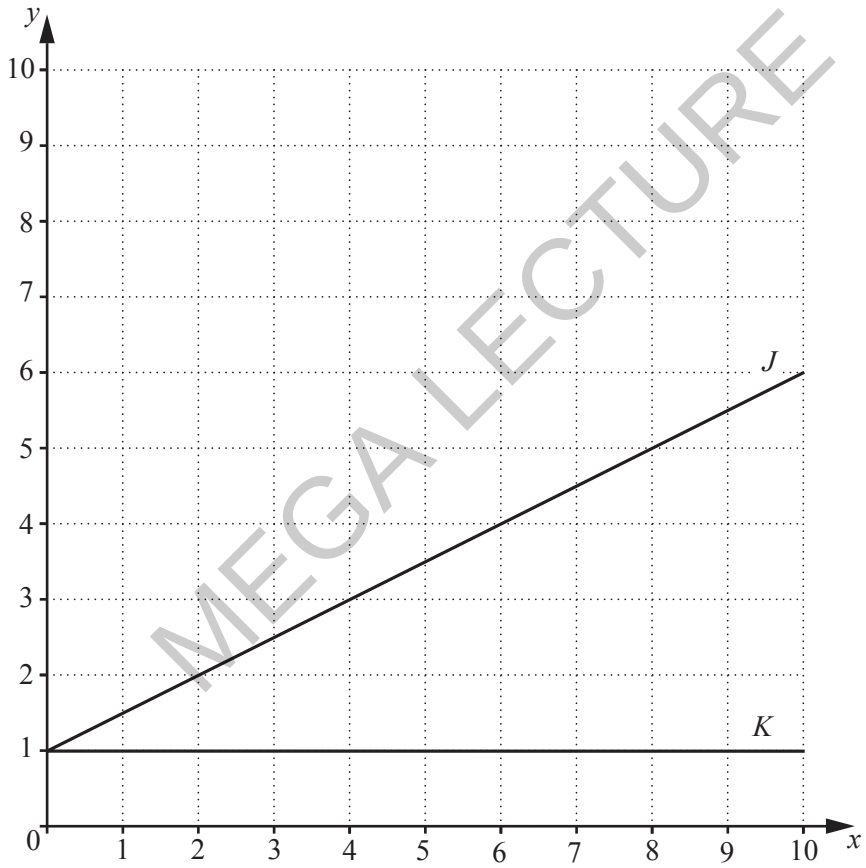

(i) Find the gradient of line J.

Answer ..... [1]

(ii) Write down the equation of line K.

Answer ..... [1]

(iii) Draw a line, L, through (6, 1) such that the area enclosed between J, K and L is 6 cm^2.

[1]

(iv) Find the equation of line L.

Answer ..... [2]

(v) The line N is perpendicular to line J at (2, 2).

Find the coordinates of the point where line N crosses the y-axis.

Answer ..... [2]

13 P is $(-4, 4)$ and Q is $(3, -2)$.

M is the midpoint of PQ.

(a) Find the coordinates of M.

Answer (..... , ...) [1]

(b) Find the gradient of the line PQ.

Answer ..... [1]

(c) Q is the midpoint of the line PQR.

(i) Find the coordinates of R.

Answer (..... , ...) [2]

(ii) **Write down** the value of $\frac{PM}{MR}$.

Answer ..... [1]

14 P is $(-1, 3)$ and Q is $(5, -1)$.

(a) Find the coordinates of the midpoint of PQ.

Answer (..... , ...) [1]

(b) Find the gradient of the line PQ.

Answer ..... [1]

(c) Given that the length of $PQ = 2\sqrt{n}$ units, where n is an integer, find the value of n.

Answer $n =$ ..... [2]

15 A line has equation $3y = 2 - x$.

(a) Find the gradient of the line.

Answer ..... [1]

(b) The line passes through the point $(5, k)$.

Find the value of k.

Answer $k =$ ..... [1]

16 A is the point (0, 4) and B is the point (–6, 1).

(a) M is the midpoint of the line AB.

Find the coordinates of M.

Answer (....., ...) [1]

(b) Find the equation of the line AB.

Answer .....[2]

17 You may use the graph paper on the next page to help answer this question.

The point A is (0, 7), and the point B is (6, 9).

(a) Express $\overrightarrow{AB}$ as a column vector.

[1]

(b) Find the gradient of AB.

..... [1]

(c) The equation of the line AB is $x + Py + Q = 0$.

Find P and Q.

Answer $P =$ .....

$Q =$ ..... [2]

(d) The point C is (12, 2).

(i) Given that C is the midpoint of BM, find the coordinates of M.

Answer (..... , ...) [1]

(ii) Calculate AC.

Answer ..... units [1]

(iii) The point D lies on the line AB.
The line CD is parallel to the y-axis.

(a) Find the coordinates of D.

Answer (..... , ...) [2]

18 P is the point (–2, 1) and Q is the point (3, 7).

(a) M is the midpoint of PQ.

Find the coordinates of M.

Answer (....., ...) [1]

(b) Find the gradient of the line PQ.

Answer ..... [1]

(c) The line with equation $2y + 3x + k = 0$ passes through the point P.

(i) Find k.

Answer k = ... [2]

(ii) Find the gradient of this line.

Answer ..... [1]

19 A straight line passes through the points $P(-8, 10)$ and $Q(4, 1)$.

Find

(a) the coordinates of the midpoint of PQ,

(*a*) (..... , ...) [1]

(b) the equation of PQ.

(*b*) ..... [2]