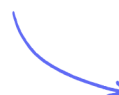


Coordinate Geometry

Coordinates / Midpoint of a Line / Gradient of a Line / Length of a Line

Easy (12 questions)	/21
Medium (8 questions)	/21
Hard (12 questions)	/46
Very Hard (5 questions)	/29
Total Marks	/117

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Easy Questions

- 1 The point A has coordinates $(2, 3)$.
The point B has coordinates $(6, 8)$.

M is the midpoint of the line AB .
Find the coordinates of M .

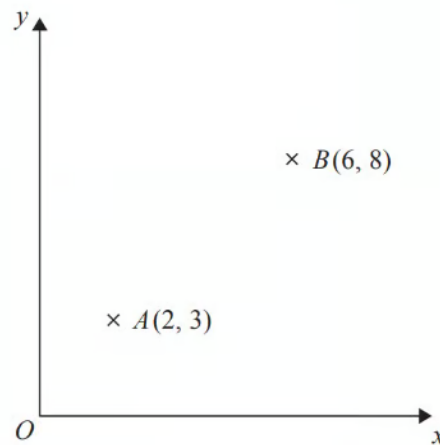


Diagram **NOT**
accurately drawn

(2 marks)

- 2 The straight line L has equation $2y + 7x = 10$

Find the gradient of L .

(2 marks)

- 3 Point A has coordinates $(5, 8)$
Point B has coordinates $(9, -4)$

Work out the gradient of AB .

(2 marks)

- 4 (a)** The point A has coordinates $(5, -4)$
The point B has coordinates $(13, 1)$

Work out the coordinates of the midpoint of AB .

(2 marks)

- (b)** Line L has equation $y = 2 - 3x$

Write down the gradient of line L .

(1 mark)

- 5** Find the gradient of the straight line with equation $5x + 2y = 7$.

(2 marks)

- 6** A is $(2, 13)$ and B is $(10, 1)$

Choose the midpoint of AB .

- A.** $(4, 6)$
- B.** $(5, 6.5)$
- C.** $(6, 7)$
- D.** $(8, 12)$

(1 mark)

- 7** P is $(4, 9)$ and Q is $(-2, 1)$
Choose the midpoint of PQ .

- A.** $(1, 5)$

B. (3, 4)

C. (3, 5)

(1 mark)

8 Choose the point that does **not** lie on the curve $y = x^3$

A. $\left(-\frac{1}{2}, -\frac{1}{8}\right)$

B. (5, 125)

C. $\left(\frac{1}{3}, \frac{1}{9}\right)$

D. (-1, -1)

(1 mark)

9 A is (2, 12) and B is (8, 2)

Choose the midpoint of AB .

A. (3, 5)

B. (4, 6)

C. (5, 7)

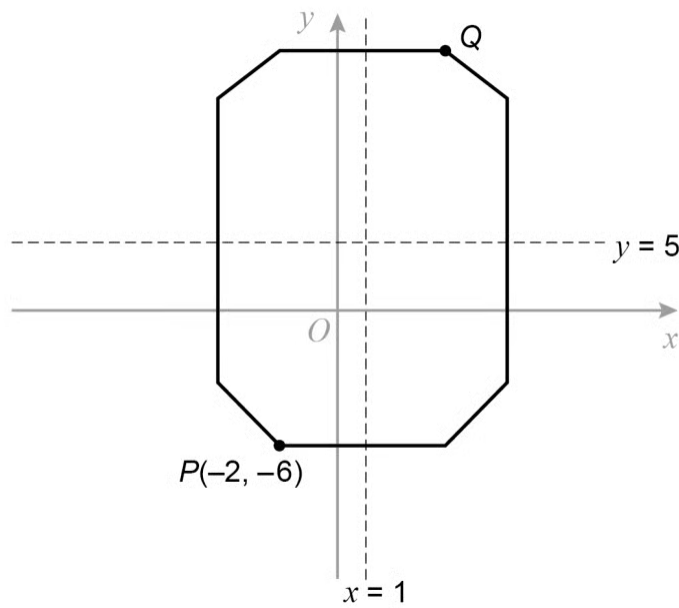
D. (6, 10)

(1 mark)

10 Work out the gradient of the straight line through (-2, 3) and (1, 9)

(2 marks)

11 The diagram shows an octagon



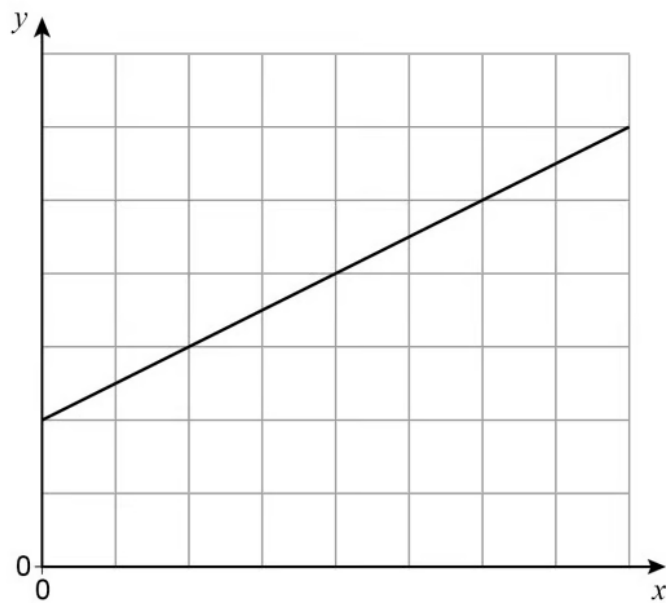
Not drawn
accurately

$x = 1$ and $y = 5$ are lines of symmetry.

Work out the coordinates of point Q .

(2 marks)

12 (a) A straight line is drawn on the centimetre grid.



Fay assumes that the scale is 1 cm represents 1 unit.

Use her assumption to work out the gradient of the line.

(1 mark)

(b) In fact, the scale is 1 cm represents 2 units.

Which statement is correct?

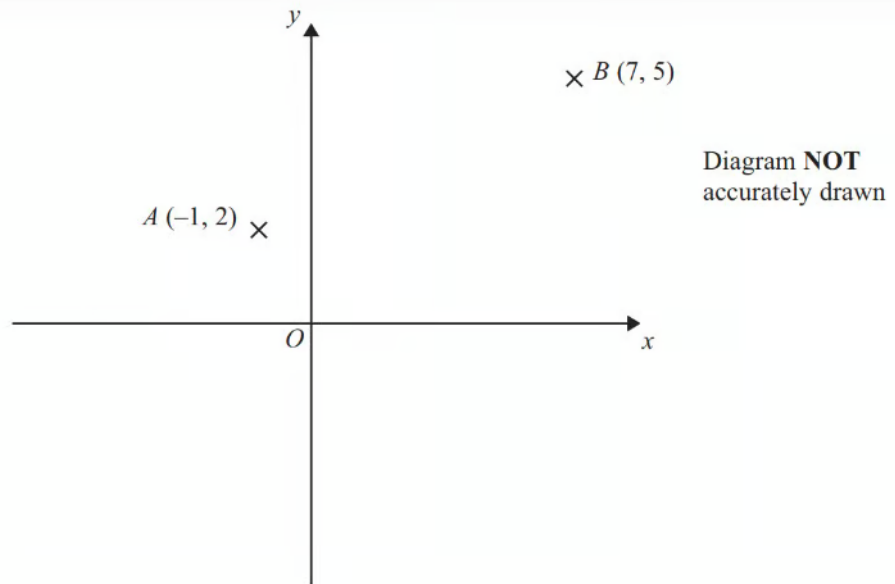
Tick **one** box.

- ☐ The answer to part (a) is too big
- ☐ The answer to part (a) stays the same
- ☐ The answer to part (a) is too small

(1 mark)

Medium Questions

1 (a)



A is the point $(-1, 2)$

B is the point $(7, 5)$

Find the coordinates of the midpoint of AB .

(2 marks)

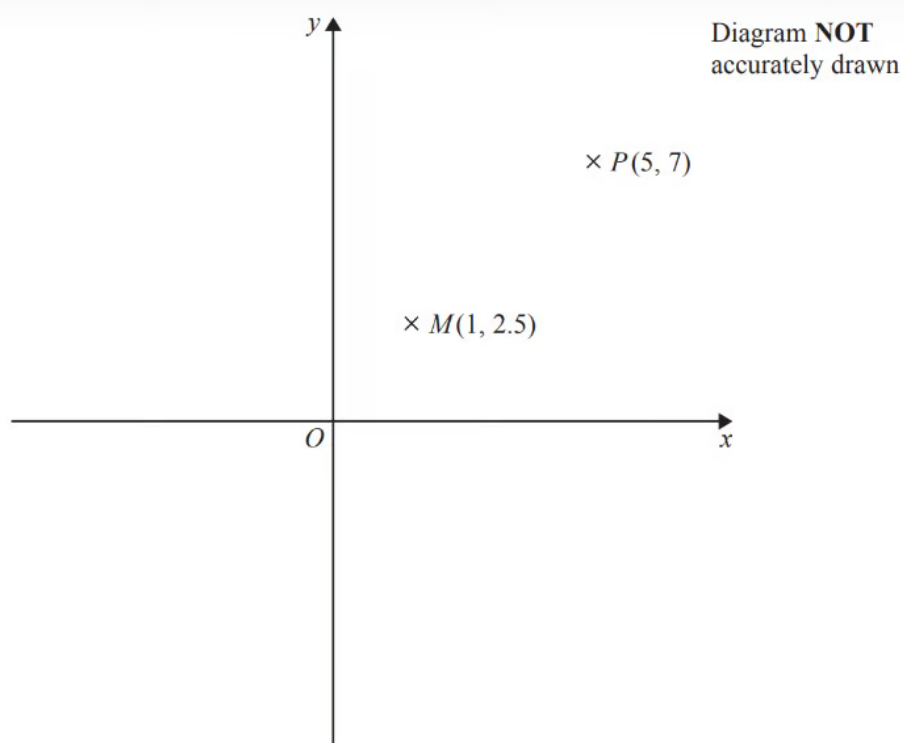
(b) P is the point $(-4, 4)$

Q is the point $(1, -5)$

Find the gradient of PQ .

(2 marks)

2



Point P has coordinates $(5, 7)$.

Point M has coordinates $(1, 2.5)$.

Point M is the midpoint of the line PQ .

Find the coordinates of point Q .

(2 marks)

3 Here are the equations of four straight lines.

Line A $y = 2x + 4$

Line B $2y = x + 4$

Line C $2x + 2y = 4$

Line D $2x - y = 4$

Two of these lines are parallel.

Write down the two parallel lines?

(1 mark)

- 4 Point A has coordinates $(-3, 11)$
Point B has coordinates $(47, b)$
The midpoint of AB has coordinates $(a, -19)$

Find the value of a and the value of b .

$a =$

$b =$

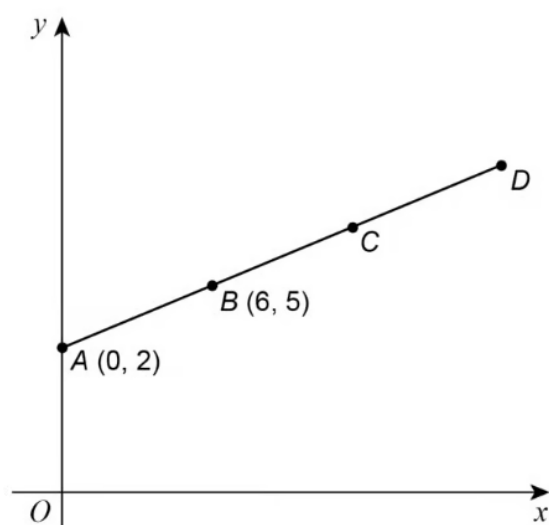
(2 marks)

- 5 P is the point $(2, 14)$
 Q is the point $(6, 8)$
 R is the point $(2, 5)$

Use gradients to show that angle PQR is not a right angle.

(3 marks)

- 6 $A(0, 2)$ and $B(6, 5)$ are points on the straight line $ABCD$.



Not drawn
accurately

$$AB = BC = CD$$

Work out the coordinates of D .

(3 marks)

- 7 (a) A is the point $(2, -5)$

B is the point $(4, -9)$

Show that the gradient of the straight line passing through A and B is -2

(2 marks)

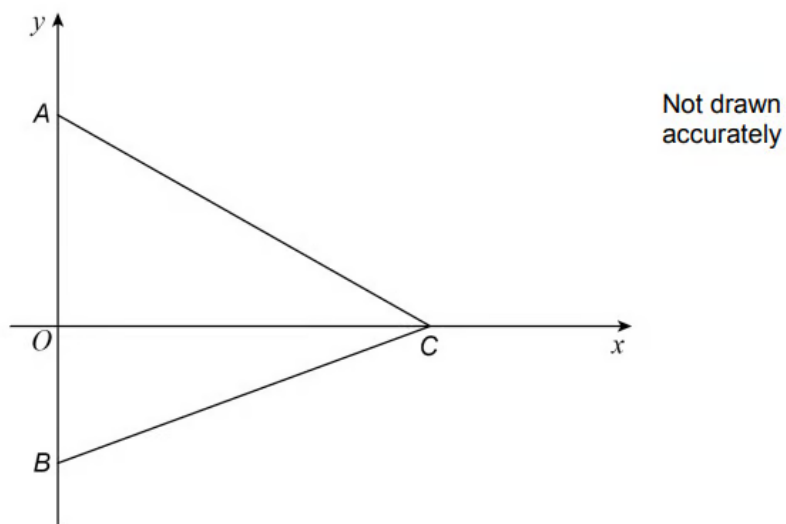
- (b) C is the point $(-301, 601)$

Does C lie on the straight line passing through A and B ?

You **must** show your working.

(2 marks)

8 A , B and C are points on the axes as shown.



The area of triangle ABC is 28 square units.

Work out possible coordinates for A , B and C .

A (..... ,)

B (..... ,)

C (..... ,)

(2 marks)

Hard Questions

- 1 Here is a cuboid drawn on a 3-D grid.

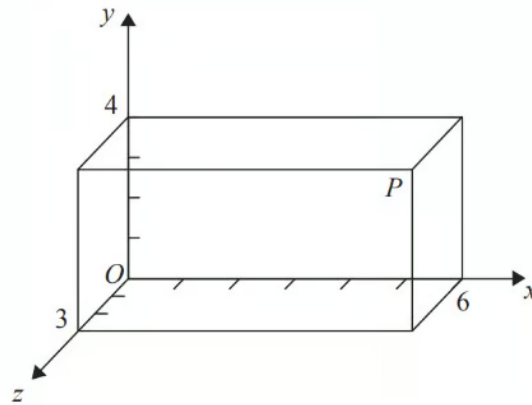


Diagram **NOT**
accurately drawn

P is a vertex of the cuboid.

T divides the line OP in the ratio $1 : 2$

Find the coordinates of T .

(2 marks)

- 2 (a) A and B are two points.

Point A has coordinates $(-2, 4)$.

Point B has coordinates $(8, 9)$.

C is the midpoint of the line segment AB .

Find the coordinates of C .

(2 marks)

(b) D is the point with coordinates $(100, 56)$.

Does point D lie on the straight line that passes through A and B ?
You must show how you work out your answer.

(3 marks)

3 The points A , B and C lie in order on a straight line.

The coordinates of A are $(2, 5)$

The coordinates of B are $(4, p)$

The coordinates of C are $(q, 17)$

Given that $AC = 4AB$, find the values of p and q .

(3 marks)

4 Q , R and S are points on a grid.

Q is the point with coordinates $(106, 103)$

R is the point with coordinates $(106, 105)$

S is the point with coordinates $(104, 105.5)$

P and A are two other points on the grid such that

R is the midpoint of PQ

S is the midpoint of PA

Work out the coordinates of the point A .

(3 marks)

- 5 A triangle has vertices P , Q and R .

The coordinates of P are $(-3, -6)$

The coordinates of Q are $(1, 4)$

The coordinates of R are $(5, -2)$

M is the midpoint of PQ .

N is the midpoint of QR .

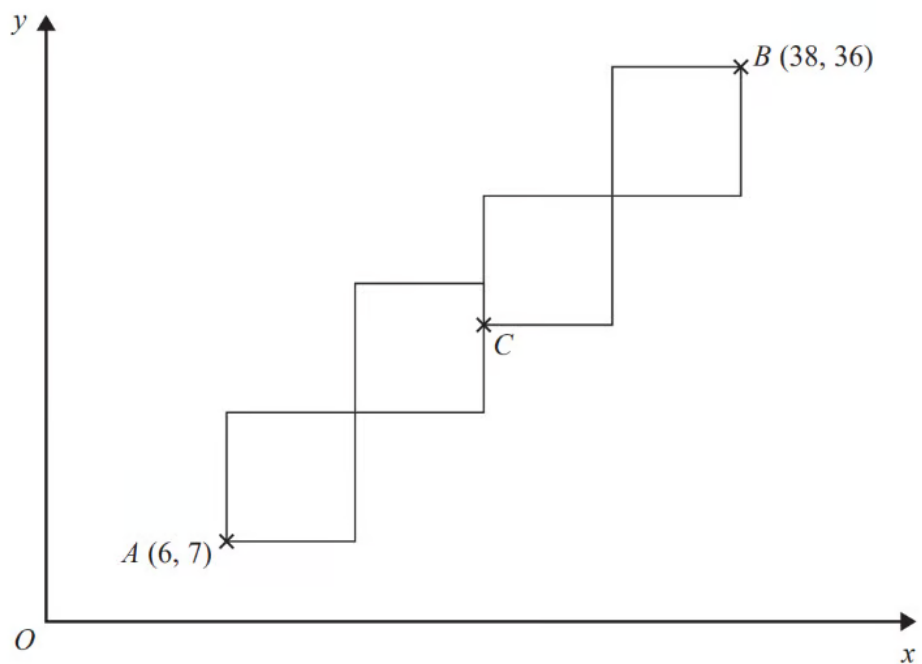
Prove that MN is parallel to PR .

You must show each stage of your working.

(4 marks)

- 6 A pattern is made from four identical squares.

The sides of the squares are parallel to the axes.



Point **A** has coordinates (6, 7)

Point **B** has coordinates (38, 36)

Point **C** is marked on the diagram.

Work out the coordinates of **C**.

(5 marks)

7 **AB** is a line segment.

A is the point with coordinates (3, 6, 7).

The midpoint of **AB** has coordinates (−2, 2, 5).

Find the coordinates of **B**.

(2 marks)

8 **A** and **B** are straight lines.

Line **A** has equation $2y = 3x + 8$

Line **B** goes through the points $(-1, 2)$ and $(2, 8)$

Do lines **A** and **B** intersect?

You must show all your working.

(3 marks)

9 (a) A rectangle $ABCD$ is to be drawn on a centimetre grid such that

A has coordinates $(-4, -2)$

B has coordinates $(1, 10)$

C has coordinates $(19, a)$

D has coordinates (b, c)

Work out the value of a , the value of b and the value of c .

$a = \dots\dots\dots$

$b = \dots\dots\dots$

$c = \dots\dots\dots$

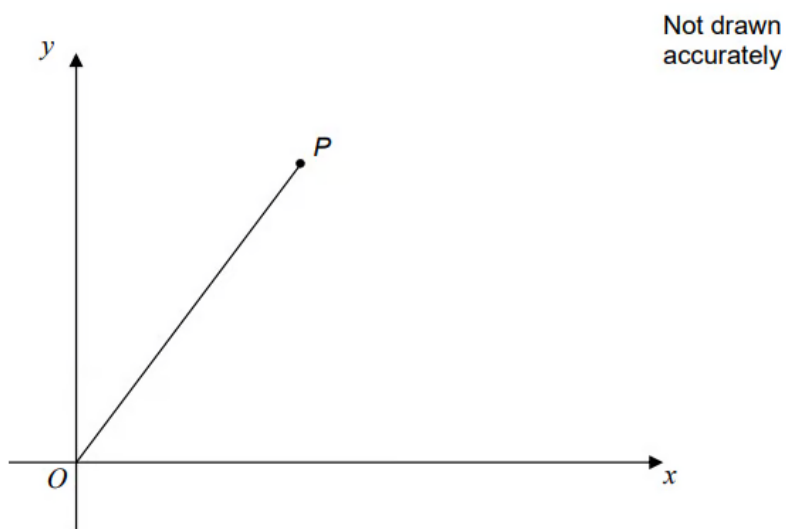
(4 marks)

(b) Calculate the perimeter, in centimetres, of rectangle ABCD.

..... cm

(3 marks)

10 The diagram shows a line joining O to P .



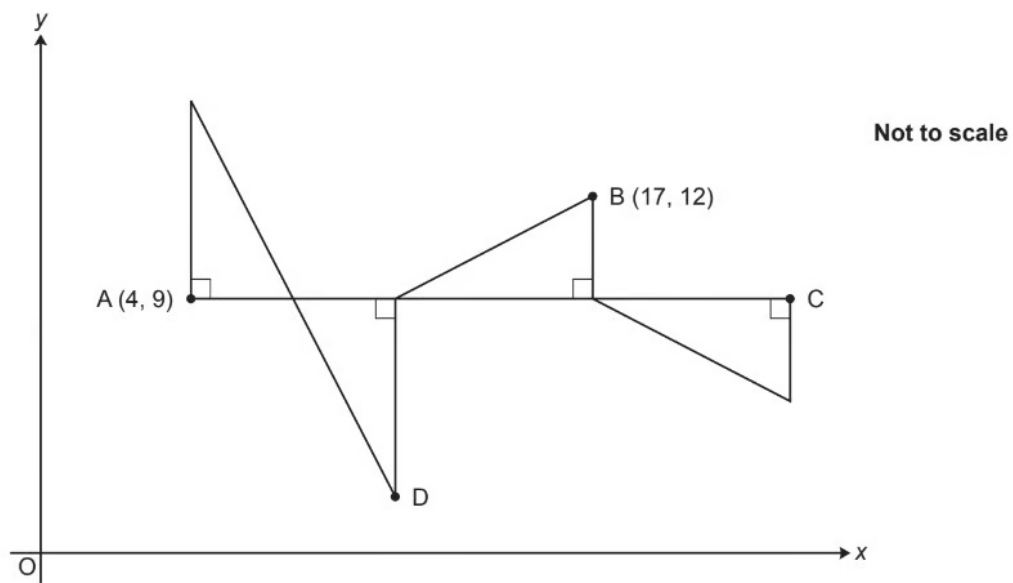
The gradient of the line is 2

The length of the line is $\sqrt{2645}$

Work out the coordinates of P .

(4 marks)

11 A pattern is made from four congruent right-angled triangles.



The line AC is parallel to the x - axis.

The point A has coordinates (4, 9) and the point B has coordinates (17, 12).

Work out the coordinates of point C and point D.

C (..... ,)

D (..... ,)

(5 marks)

12 A straight line goes through the points (p, q) and (r, s) , where

- $p + 2 = r$

- $q + 4 = s.$

Find the gradient of the line.

(3 marks)

Very Hard Questions

- 1 ABC is a triangle in which angle $ABC = 90^\circ$

p and q are integers such that

the coordinates of A are $(p, 10)$

the coordinates of B are $(-1, -5)$

the coordinates of C are $(8, q)$

Given that the gradient of AC is $-\frac{6}{7}$ work out the value of p and the value of q

$p =$

$q =$

(5 marks)

- 2 The straight line L has equation $x - y = 3$
The curve C has equation $3x^2 - y^2 + xy = 9$

L and C intersect at the points P and Q .

Find the coordinates of the midpoint of PQ .
Show clear algebraic working.

(6 marks)

- 3 Triangle HJK is isosceles with $HJ = HK$ and $JK = \sqrt{80}$

H is the point with coordinates $(-4, 1)$

J is the point with coordinates $(j, 15)$ where $j < 0$

K is the point with coordinates $(6, k)$

M is the midpoint of JK .

The gradient of HM is 2

Find the value of j and the value of k .

(6 marks)

- 4 The curve with equation $x^2 - x + y^2 = 10$ and the straight line with equation $x - y = -4$ intersect at the points A and B .

Work out the exact length of AB .

Show your working clearly and give your answer in the form $\frac{\sqrt{a}}{2}$ where a is an integer.

(6 marks)

- 5 The curve with equation $y = (10x - 3)(x + 1)$ and the line with equation $y - 6x = 0$ intersect at the points A and B .

Find the coordinates of the midpoint of AB . Show your working clearly.

(6 marks)