# MME

# Coordinates and Ratios

Please write clearly in block capitals

| Forename: |
| Surname: |

## Materials

For this paper you must have:
•   mathematical instruments

You *can* use a calculator.

## Instructions

• Use black ink or black ball-point pen. Draw diagrams in pencil.
• Fill in the boxes at the top of this page.
• Answer all questions.
• You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
• Do all rough work in this book. Cross through any work you do not want to be marked.

## Information

• The marks for questions are shown in brackets.
• You may ask for graph paper, tracing paper and more answer paper. These must be tagged securely to this answer book.
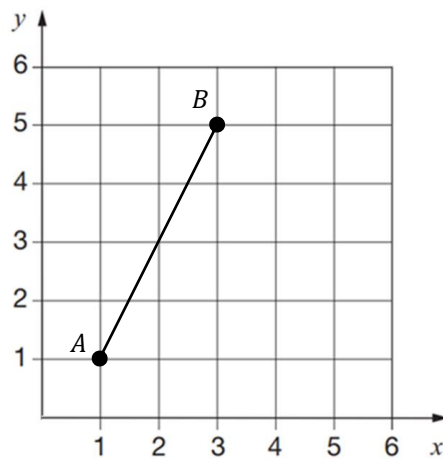
## Advice

• In all calculations, show clearly how you work out your answer.

**1**      Midpoints are points that are found exactly half way along a line.

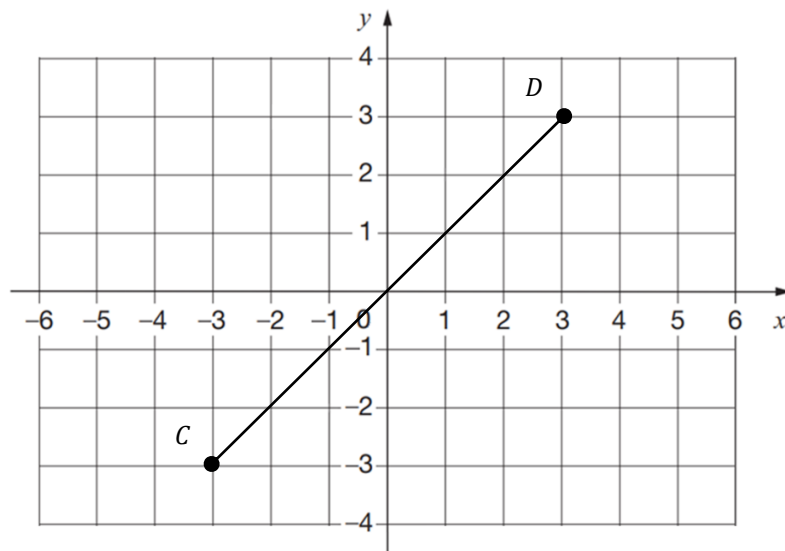**1(a)**      Find the coordinates of the midpoint for the line $AB$ , shown below.

**[1 mark]**



Answer   _____

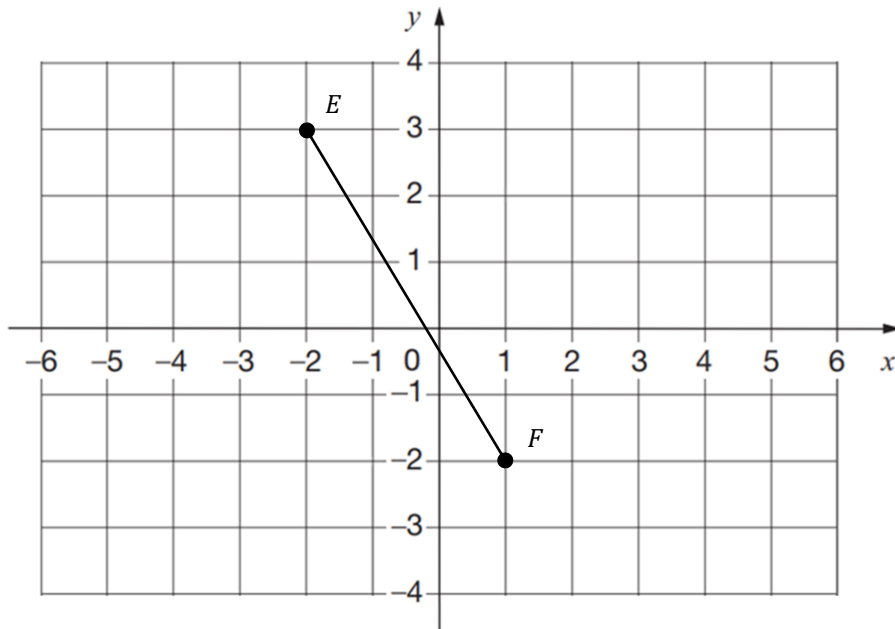**1(b)**      Find the coordinates of the midpoint for the line $CD$ , shown below.

**[1 mark]**



Answer   _____

**Question continues on next page**

2

**1(c)**     Find the coordinates of the midpoint of the line $EF$ , shown below.

**[1 mark]**



Answer _____

**2(a)**     The points $A$ and $B$ form a line segment $AB$. $M$ is the midpoint of $AB$.

$$A = (5\,,10)$$
$$B = (17\,,8)$$

Find the coordinates of $M$.

**[1 mark]**

Answer _____

**2(b)**     The points $C$ and $D$ form a line segment $CD$. $M$ is the midpoint of $CD$.

$$C = (-2,-10)$$
$$D = (-7,-14)$$

Find the coordinates of $M$.

**[1 mark]**

Answer _____

**2(c)**     The points $E$ and $F$ form a line segment $EF$. $M$ is the midpoint of $EF$.

$$E = (0,-10)$$
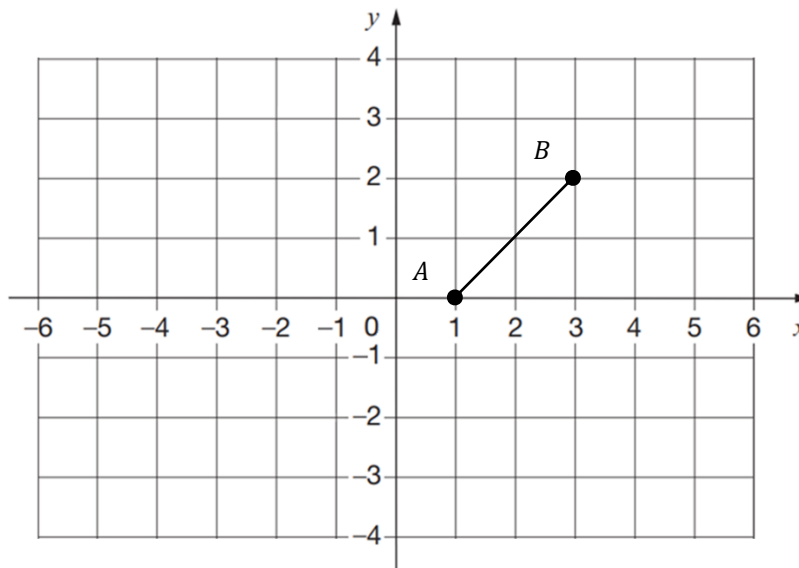$$F = (-6,0)$$

Find the coordinates of $M$.

**[1 mark]**

Answer _____

**Turn over for next question**

3

**3**  $A$ and $B$ are two points of a square $ABCD$.



Write down two sets of possible coordinates for $C$ and $D$.

**[2 marks]**

_____

_____

_____

_____

_____

_____

_____

_____

_____

$C =$ _____ and $D =$ _____

$C =$ _____ and $D =$ _____

**Turn over for next question**

2

Turn over ▶

**4**

**4(a)**  Point $D$ lies on a line $AB$ such that $AD$ is $\frac{2}{3}$ of the total length of $AB$.

Given that $A(2, 4)$ and $B(17, 13)$, find the point $D$.

**[3 marks]**

$D =$ _____

**4(b)**  $E$ lies on the line $AB$ such that $AE$ is $\frac{5}{7}$ of the total length of $AB$.

Given that $A(0, 10)$ and $B(-21, -25)$, find the point $E$.

**[3 marks]**

$E =$ _____
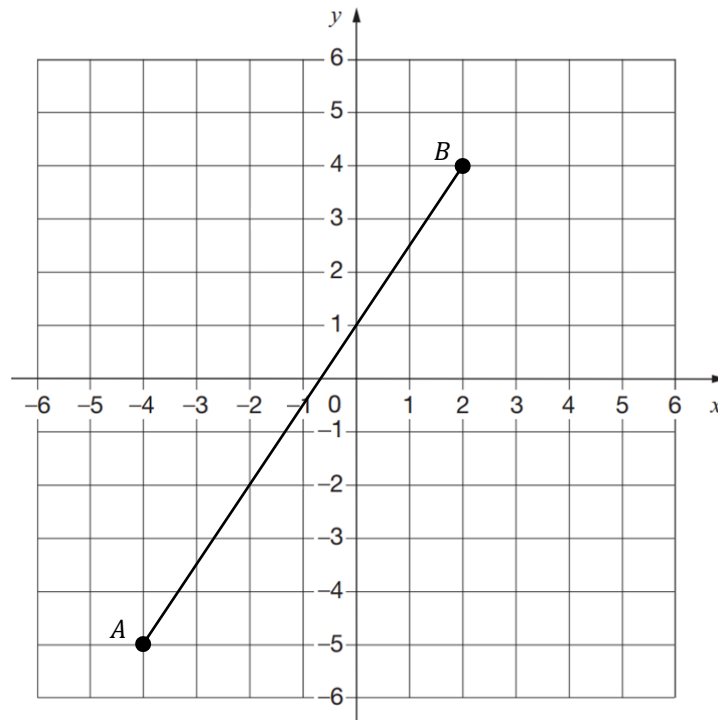
6

Turn over ►

**5**   Point C lies on the line segment AB

C is such that the ratio $AC:CB = 1:2$



**5(a)**   What are the coordinates of the point $C$?

**[2 marks]**

_____

_____

$C =$ _____

**5(b)**   Another point $X$ lies on the line segment $AB$.

This divides the line segment in the ratio $AC:CX:XB = 2:1:3$

What are the coordinates of the point $X$?

**[2 marks]**

_____

_____

_____

$X =$ _____

4

Turn over ▶

**6**    $F$ lies on a line $AB$ such that $AF$ is $\frac{3}{4}$ of the length of $AB$.

**6(a)**    Given that $A(0,0)$ and $B(20,-8)$, find the point $F$.

**[2 marks]**

$F =$ _____

**6(b)**    G lies on $AF$ such that $AG:GF = 1:2$.

Write down the ratio $AG:GF:FB$.

**[1 mark]**

Answer: _____

**6(c)**    Hence find the co-ordinate $G$.
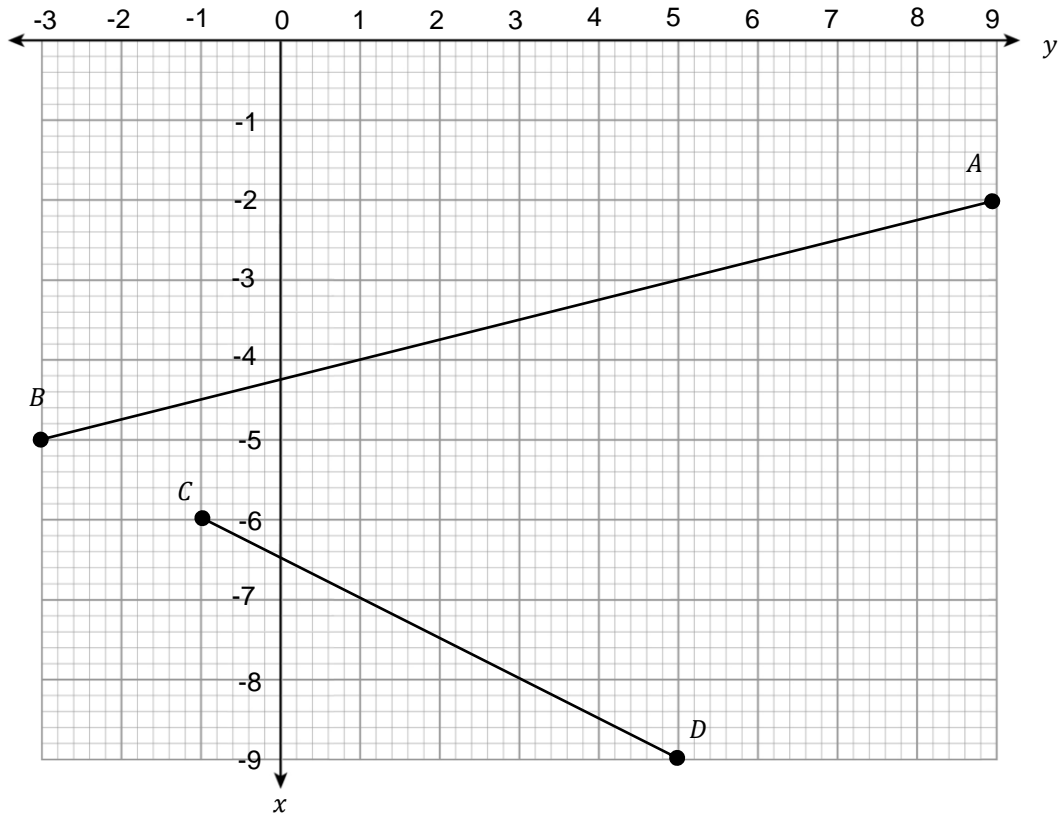
**[2 marks]**

$G =$ _____

5

Turn over ►

**7**   $X$ is a point on the line segment $AB$.

$Y$ is a point on the line segment $CD$.

$AX:XB = CY:YD = 1:2$



Find the equation of the line $XY$ and plot this on the graph above, making sure to label any points of interest.

**[4 marks]**

Answer _____
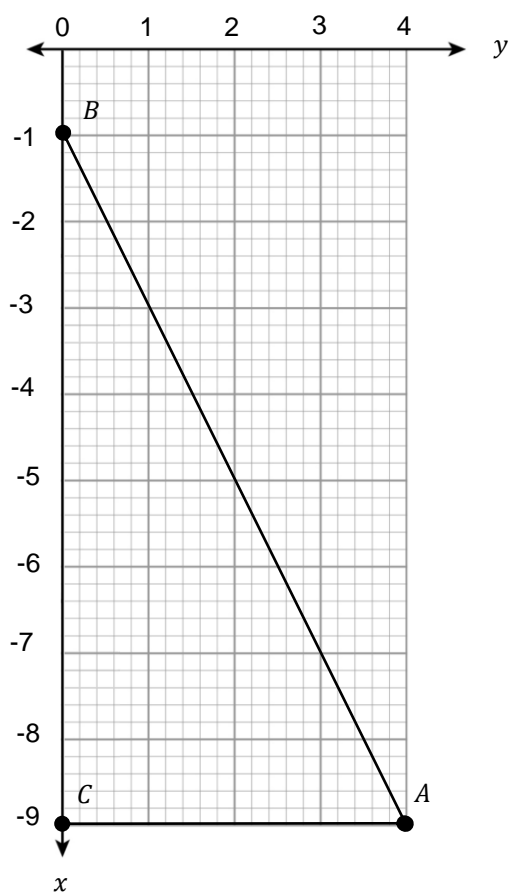
**Turn over for next question**

**4**

Turn over ▶

**8**    The midpoints of the lines $AB$, $BC$ and $AC$ are $X$, $Y$ and $Z$ respectively.



By first finding the points $X$,$Y$ and $Z$, draw the shape $XYZ$ on the diagram above.

**[3 marks]**

_____

_____

_____

_____

_____

**End of Questions**

3

END