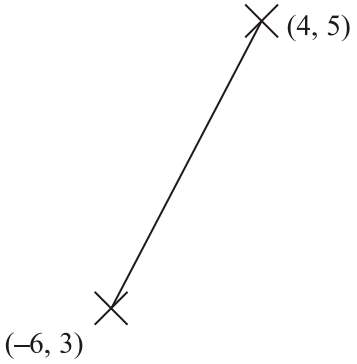
1. Work out the coordinates of the midpoint of the line joining the points (4, 5) and (−6, 3).



(..... , ...)

(Total 2 marks)

2.

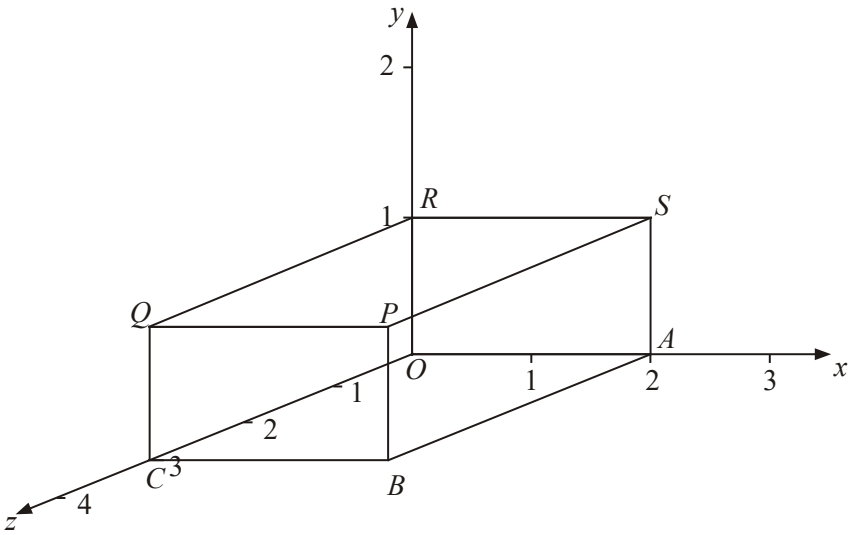


Diagram **NOT** accurately drawn

A cuboid is shown on a 3-dimensional grid.

(a) Write down the letter of the point with coordinates (2, 1, 0).

.....

(1)

(b) Write down the coordinates of the point P.

(..... , ... , ...)

(1)

(Total 2 marks)

3. The point A has coordinates (–12, 5).

The point B has coordinates (12, 3).

M is the midpoint of the line segment AB.

Find the coordinates of M.

(....., ...)

(Total 2 marks)

4. The point A has coordinates (–4, 1).
The point B has coordinates (7, y).
The point (x, 3) is the midpoint of the line segment AB.

Find the value of x and the value of y.

x = ...

y = ...

(Total 2 marks)

5. A is the point with coordinates $(2, -6)$
B is the point with coordinates $(4, 14)$

M is the midpoint of the line segment AB.

Work out the coordinates of the point M.

(....., ...)
(Total 2 marks)

6.

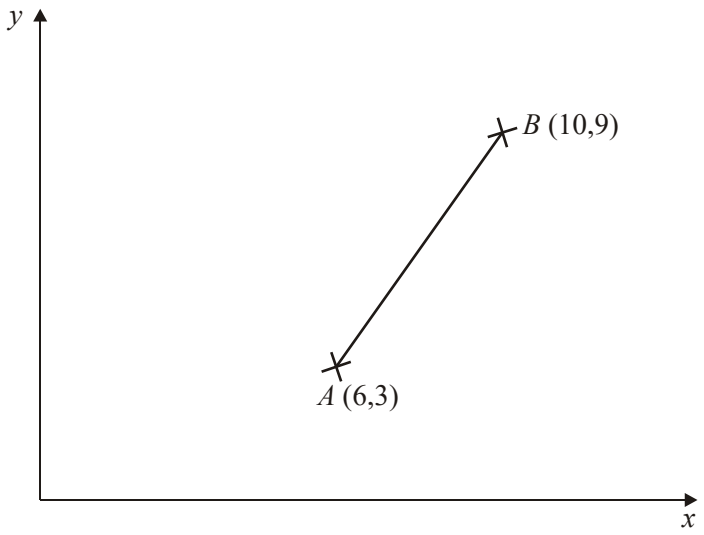


Diagram **NOT** accurately drawn

A is the point with coordinates (6, 3).
B is the point with coordinates (10, 9).

M is the midpoint of the line *AB*.

Work out the coordinates of the point *M*.

(…… , ……)
(Total 2 marks)

7.

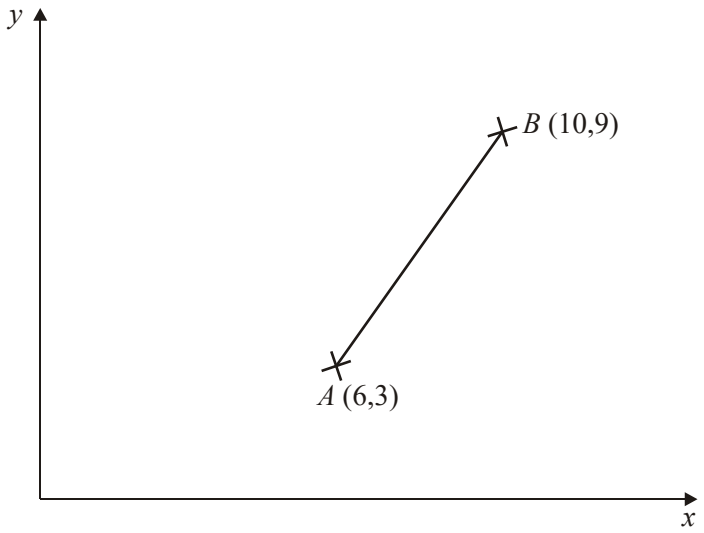


Diagram **NOT** accurately drawn

A is the point with coordinates (6, 3).
B is the point with coordinates (10, 9).

M is the midpoint of the line *AB*

Work out the coordinates of the point *M*.

(....., ...)
(Total 2 marks)

8. The sketch shows the coordinates of the endpoints of the line AB.

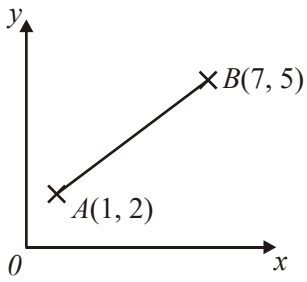


Diagram **NOT** accurately drawn

Work out the coordinates of the midpoint of the line AB.

(4, 3½)	(3, 3)	(3½, 2½)	(2, 3½)	(3, 1½)
☐	☐	☐	☐	☐
A	**B**	**C**	**D**	**E**

(Total 1 mark)

9.

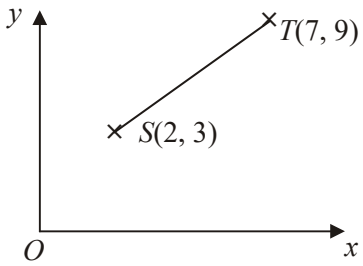


Diagram **NOT** accurately drawn

Which are the coordinates of the midpoint of the line ST ?

(3½, 4½)	(4½, 6)	(5, 6)	(6, 2½)	(6, 4½)
A	**B**	**C**	**D**	**E**

(Total 1 mark)

10. A cuboid is shown on a 3-D grid.

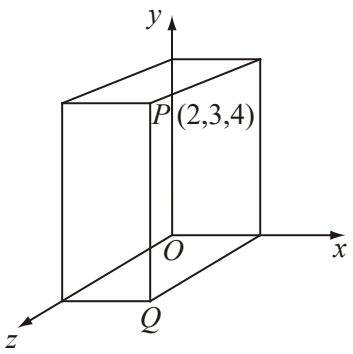


Diagram **NOT** accurately drawn

The point P has the coordinates (2, 3, 4).

The coordinates of the point Q are

(2, 3, 0)	(0, 3, 4)	(0, 0, 4)	(2, 0, 0)	(2, 0, 4)
A	**B**	**C**	**D**	**E**

(Total 1 mark)

11.

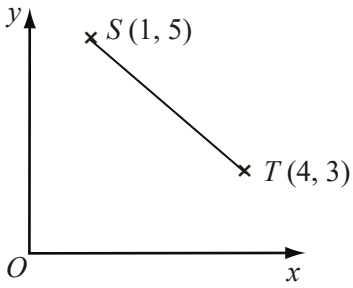


Diagram **NOT** accurately drawn

What are the coordinates of the midpoint of the line segment ST?

(2½, 4)	(2½, 5)	(3, 2)	(2, 4)	(1½, 1)
A	**B**	**C**	**D**	**E**

(Total 1 mark)

12. The diagram shows a cuboid.

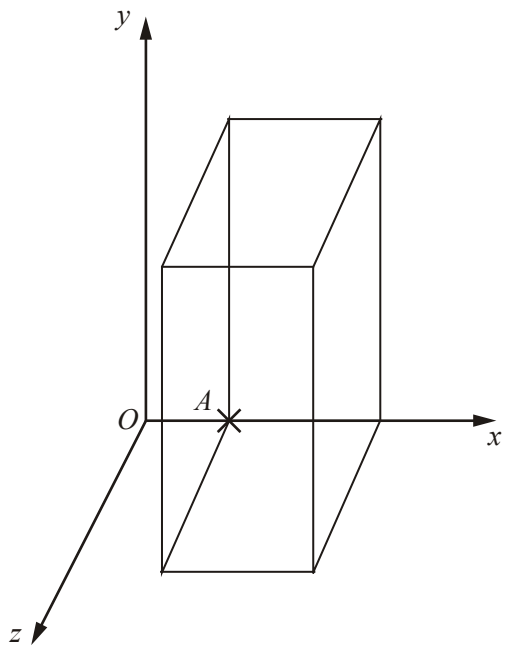


Diagram **NOT** accurately drawn

Three of the vertices of this cuboid are

A (2, 0, 0) *B* (5, 0, 0) *C* (2, 6, 0)

The point *A* is shown on the diagram.

On the diagram mark with a cross (✕) and label the two vertices *B* and *C*.

(Total 2 marks)

13.

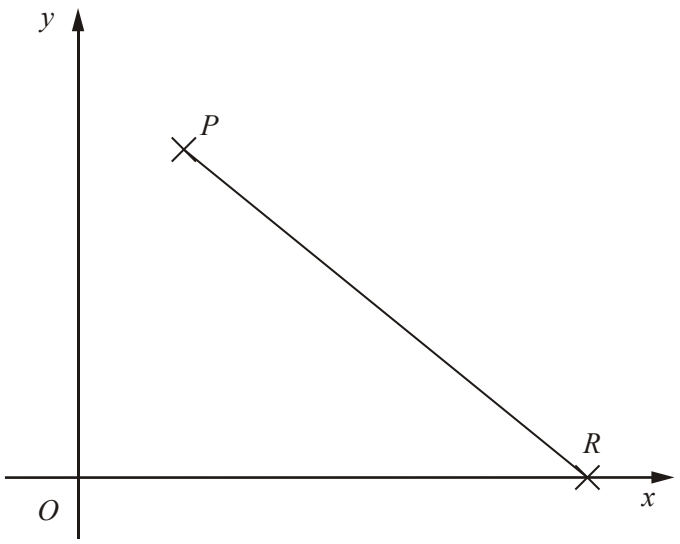


Diagram **NOT** accurately drawn

P has coordinates (1, 4)
R has coordinates (5, 0)

Find the coordinates of the mid-point of the line *PR*.

(..... , ...)

(Total 2 marks)

14.

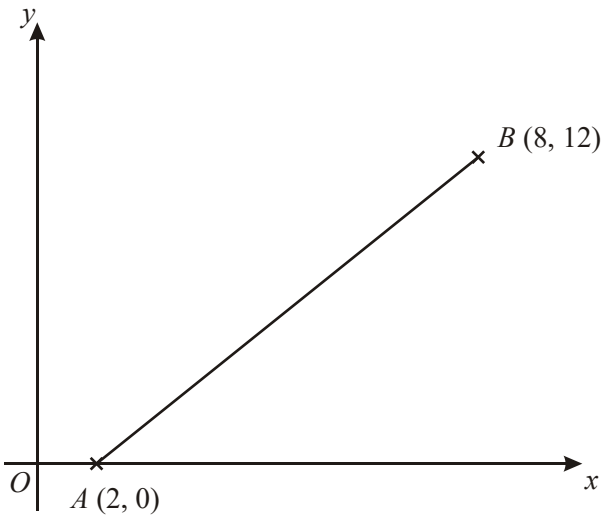


Diagram **NOT** accurately drawn

A is the point (2, 0).

B is the point (8, 12).

Work out the coordinates of the midpoint of *AB*.

(..... , ...)

(Total 2 marks)

15. A cuboid is drawn on a 3-D grid.

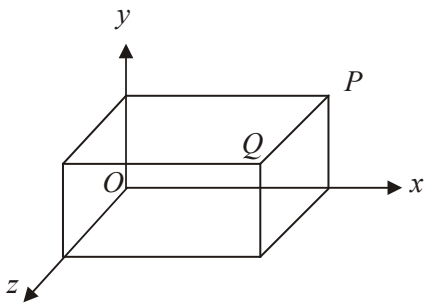


Diagram **NOT** accurately drawn

The point Q has coordinates (3, 1, 2).

The coordinates of the point P are

(3, 1, 0)	(3, 0, 2)	(0, 1, 2)	(3, 2, 0)	(2, 1, 3)
A	**B**	**C**	**D**	**E**

(Total 1 mark)

16. R is the point with coordinates (4, 1)
S is the point with coordinates (6, 5)

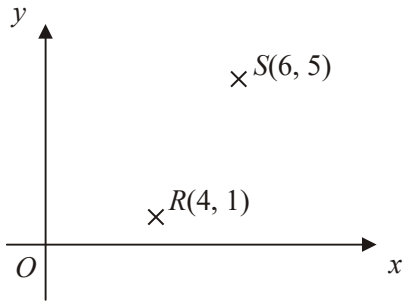


Diagram **NOT** accurately drawn

Which are the coordinates of the midpoint of the line RS?

(1, –3)	(10, 6)	(2, 4)	(5, 3)	(1, 2)
A	**B**	**C**	**D**	**E**

(Total 1 mark)

17.

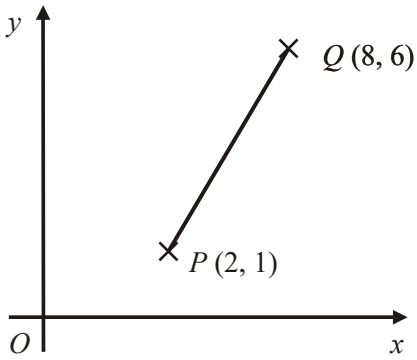


Diagram **NOT** accurately drawn

P is the point (2, 1).
Q is the point (8, 6).

Which are the coordinates of the midpoint of *PQ*?

(4, 3)	$(4,\ 3\frac{1}{2})$	$(5,\ 3\frac{1}{2})$	$(5,\ 2\frac{1}{2})$	$(3,\ 2\frac{1}{2})$
A	**B**	**C**	**D**	**E**

(Total 1 mark)

18. What are the coordinates of the midpoint of the line joining *P* (3, 4) to *Q* (5, 8)?

(2, 4)	(8, 12)	$\left(3\frac{1}{2},4\frac{1}{2}\right)$	(4, 6)	(4, 12)
A	**B**	**C**	**D**	**E**

(Total 1 mark)

1. $\left(\frac{-6+4}{2}\right),\left(\frac{5+3}{2}\right) = (–1, 4)$ 2

B2 cao
[B1 for (–1, a) or (b, 4) or (4, –1)]

[2]

2. (a) S 1

B1 for S cao

(b) (2, 1, 3) 1

B1 for (2, 1, 3) cao

[2]

3. 0, 4 2

B2 (B1 + B1)

[2]

4. $x = 1.5$
$y = 5$ 2

$\frac{-4+7}{2} = x$

$\frac{1+y}{2} = 3$

M1 for $x = \frac{-4+7}{2}$ *or better OR* $\frac{1+y}{2} = 3$ *or better*

A1 for x = 1.5 and y = 5

[2]

5. (3, 4) 2

B1 for x coordinate of 3
B1 for y coordinate of 4

[2]

6. $\frac{10+6}{2}$ $\frac{9+3}{2}$

(8, 6) 2

M1 for $\frac{10+6}{2}$ *or* $\frac{9+3}{2}$ *o.e*

A1 cao
[SC: B1 for (6,8)]

[2]

7. $\frac{10+6}{2}$ $\frac{9+3}{2}$

(8, 6) 2

M1 for $\frac{10+6}{2}$ *or* $\frac{9+3}{2}$ *o.e.*

A1 cao

[SC: B1 for (6, 8)]

[2]

8. A

[1]

9. B

[1]

10. E

[1]

11. A

[1]

12. *B* is the vertex on the *x*-axis, adjacent to *A*
C is the vertex directly above *A*. 2

B2 for points B and C correctly marked
(B1 for 1 point correctly marked)
[SC: B1 for correct points plotted but not labelled.]

[2]

13. $\frac{1+5}{2}, \frac{4+0}{2}$

(3, 2) 2

M1 for $\frac{1+5}{2}$ *or* $\frac{4+0}{2}$ *oe*

A1 cao

OR

B1 for (a, 2) where a ≠ 3 or (3, b) where b ≠ 2, if M0 scored

[SC: B1 for (2, 3)]

[2]

14. (5, 6) 2

B2 for (5, 6) oe

B1 for either (a, 6) or (5, b)

[2]

15. A

[1]

16. D

[1]

17. C

[1]

18. D

[1]

1. This question was generally answered well. Many candidates gave an answer without showing any of their working.

Of those showing their working, the most popular methods were:

- to *add* the coordinates and divide by 2
- to draw a scaled diagram with coordinate axes fully labelled
- to draw a number line and cross off the numbers from either end to find the middle value
- to subtract the coordinates, halve the result and add the answer to the smaller coordinate

The most common errors were:

- in dealing with –6, e.g. (–6–4)/2, (6–4)/2, (4–6)/2. A popular incorrect answer was (5, 1)
- a simple subtraction of the coordinates leading to (–2, 2)
- adding the coordinates but forgetting to divide by 2
- a construction using compasses to bisect the line
- to interchanged the x and y values, i.e. (4, –1)

2. About three quarters of the candidates were able to gain at least one mark on this question. In part (a), a common incorrect answer for the point with coordinates (2, 1, 0) was R, and in part (b), a common incorrect answer for the coordinates of P was (2, 3, 1).

3. There was mixed success here with many number lines drawn. Not many candidates managed to score both marks but a significant number of candidates managed to obtain one of the correct co-ordinates. (12, 8) and (6, 4) were common incorrect answers.

4. This question proved most difficult for even the most able candidate. Very few candidates demonstrated any knowledge of an algebraic approach choosing rather to solve the problem by a sketch diagram. This sometimes resulted in finding a correct x- or y- co-ordinate but rarely both; an answer of $y = 5$ was seen more than $x = 1½$.

5. This question was not done well by most candidates. Some tried to draw number lines, but failed to arrive at the correct answer. Some managed to get one coordinate correct but it was rare to find a candidate getting both correct. The most common partially correct response was (3, 10). This again highlights the problems that foundation students encounter when dealing with negative numbers as candidates seemed to obtain 10 by $– 6 + 14 = 20$ and then dividing by 2. This is a relatively new topic at this level. Centres would benefit from spending more time on developing the skills needed to answer this sort of question.

6. Foundation Tier

73% of candidates were able to obtain at least one of the coordinates correctly. Again little method was seen in the answer space for this question. Where anything was seen it was usually a diagram suggesting that candidates had found the middle number for each of the ranges 6-10 and 3-9 rather than having calculated $\frac{(6+10)}{2}$ and $\frac{(3+9)}{2}$. A significant number of candidates worked out the difference between the co-ordinates, giving (4, 6) as their answer.

7. This question was well done with most candidates scoring at least one mark for correctly quoting one of the coordinates of the midpoint. A significant number of candidates gave (4, 6) [(10 – 6), (9 – 3)] as their answer; this gained no marks.

8. No Report available for this question.

9. No Report available for this question.

10. No Report available for this question.

11. No Report available for this question.

12. Although a pleasing number of candidates were able to correctly label both of the required points, very many failed to even locate one point. If just one point was labelled correctly it would be more likely to be the point B.

13. Most candidates scored at least one mark, and usually two, for get one or both coordinates correct. On e mark was also awarded for an answer of (2, 3).

14. This question was not very well understood with the correct answer of (5, 6) rarely seen. The answer of (4, 6) was frequently seen, obtained from halving the coordinates of point B, these candidates gained 1 mark.

15. No Report available for this question.

16. No Report available for this question.

17. No Report available for this question.

18. No Report available for this question.