Midpoints

Section A: Recapping coordinates

Coordinates are written (x, y) where x is how far to the right and y is how far up.

The grid opposite shows two points.

1. Write down their coordinates:
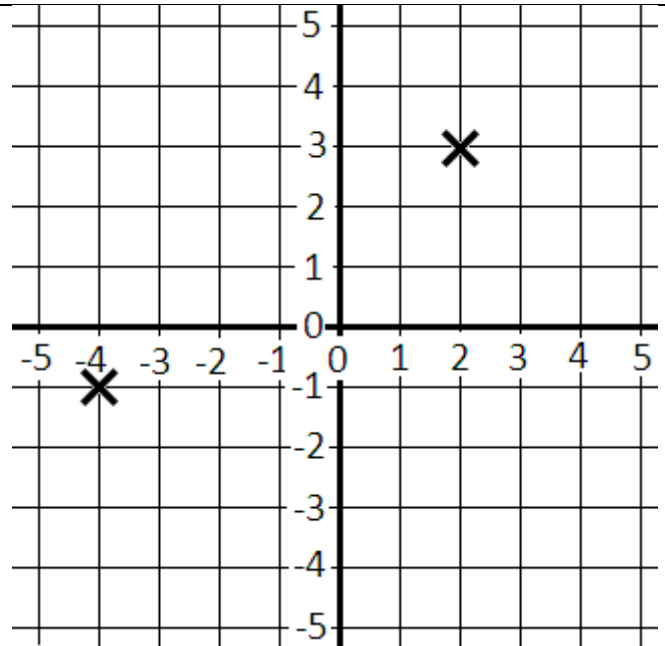
(____ , ____) and (____ , ____)

2. Mark the point with coordinates $(-4, 3)$.

3. A fourth point is needed to form the fourth corner of a rectangle. Mark it on the grid and write down its coordinates:

(____ , ____)

4. Mark a point on the graph exactly in the centre of the rectangle. Give its coordinates:

(____ , ____)

Section B: Using averages

The mean average of two numbers is always exactly halfway in between.

1. What number is exactly half way in between 7 and 9? ____

2. What is the half-way point between 12 and 20? ____

3. What is the midpoint of 30 and 45? ____

Note: often adding the two numbers together and dividing by 2 is the quickest method.

4. What is the midpoint of 3 and 19? ____

5. What is the midpoint of -7 and 12? ____

6. What is the midpoint of -12 and -4? ____
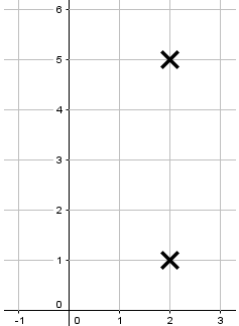
Section C: Midpoints of coordinates

The midpoint of two points on a graph is halfway along and halfway up.
Take the average of the x coordinates and the average of the y coordinates.

Eg: The midpoint between $(3, -10)$ and $(7,6)$ is: $\left(\frac{3+7}{2}, \frac{-10+6}{2}\right)$ $\implies$ $(\mathbf{5}, \mathbf{-2})$

(5 *is halfway between* 3 *and* 7, *and* -2 *is halfway between* -10 *and* 6)

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1. Find the midpoint of:
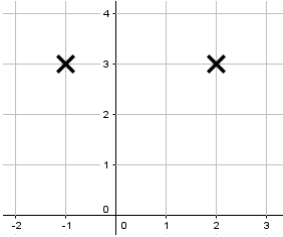
$(2,1)$ *and* $(2,5)$

(_____ , _____)

6. Find the midpoint of:

$(7, -12)$ *and* $(-2, -10)$

(_____ , _____)

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2. Find the midpoint of:
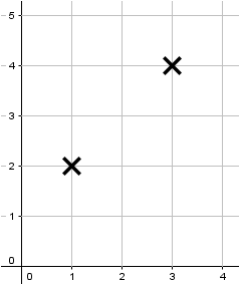
$(-1,3)$ *and* $(2,3)$

(_____ , _____)

7. Find the midpoint of:

$(-2, -1)$ *and* $(2,1)$

(_____ , _____)

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3. Find the midpoint of:

$(1,2)$ *and* $(3,4)$
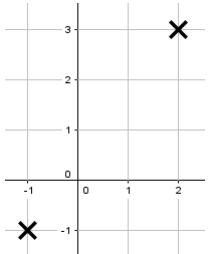
(_____ , _____)

8. Find the midpoint of:

$(77, -100)$ *and* $(-27, -144)$

(_____ , _____)

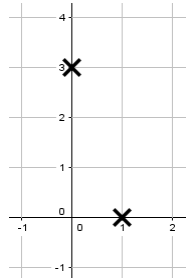**4. Find the midpoint of:**

$(-1, -1)$ *and* $(2,3)$

(_____ , _____)

9. The midpoint of A and B is $(4,9)$.

A is the point $(1,3)$

B is: (_____ , _____)

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5. Find the midpoint of:

$(1,0)$ *and* $(0,3)$

(_____ , _____)

10. The midpoint of A and B is $(-4,3)$.

B is the point $(7, -3)$

A is: (_____ , _____)

Midpoints SOLUTIONS

Section A: Recapping coordinates
Coordinates are written (x, y) where x is how far to the right and y is how far up.

The grid opposite shows two points.

1. Write down their coordinates:

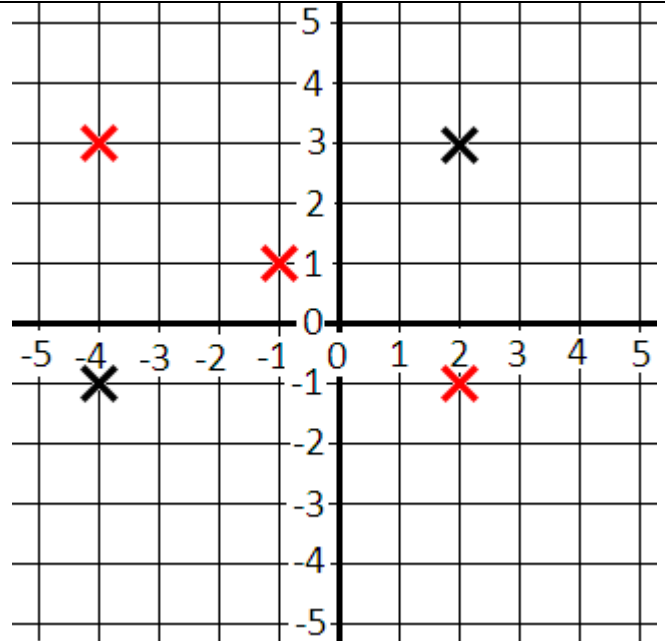$$(\underline{-4} , \underline{-1}) \text{ and } (\underline{2} , \underline{3})$$

2. Mark the point with coordinates $(-4,3)$.

3. A fourth point is needed to form the fourth corner of a rectangle. Mark it on the grid and write down its coordinates:

$$(\underline{2} , \underline{-1})$$

4. Mark a point on the graph exactly in the centre of the rectangle. Give its coordinates:

$$(\underline{-1} , \underline{1})$$

Section B: Using averages
The mean average of two numbers is always exactly halfway in between.

1. What number is exactly half way in between 7 and 9? **8**

2. What is the half-way point between 12 and 20? **16**

3. What is the midpoint of 30 and 45? **37.5**

Note: often adding the two numbers together and dividing by 2 is the quickest method.

4. What is the midpoint of 3 and 19? **11**

5. What is the midpoint of -7 and 12? **2.5**

6. What is the midpoint of -12 and -4? **-8**

Section C: Midpoints of coordinates
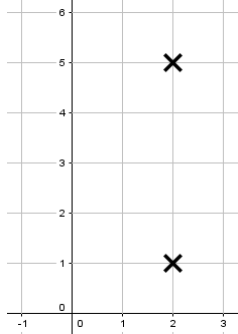*The midpoint of two points on a graph is halfway along and halfway up.*
Take the average of the x coordinates and the average of the y coordinates.

Eg: The midpoint between $(3, -10)$ and $(7,6)$ is: $\left(\frac{3+7}{2}, \frac{-10+6}{2}\right)$ $\implies$ $(\mathbf{5}, \mathbf{-2})$

(5 *is halfway between* 3 *and* 7, *and* -2 *is halfway between* -10 *and* 6)
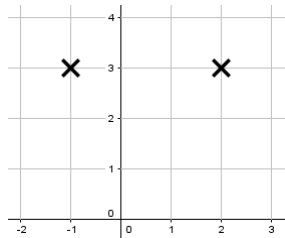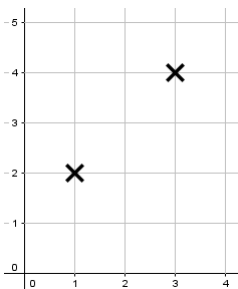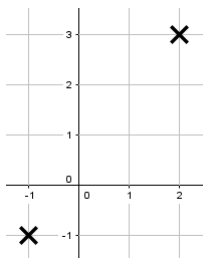
1. Find the midpoint of: $(2,1)$ *and* $(2,5)$ $(\,\mathbf{2}\,,\mathbf{3}\,)$	6. Find the midpoint of: $(7, -12)$ *and* $(-2, -10)$ $(\,\mathbf{2.5}\,,\mathbf{-11}\,)$
2. Find the midpoint of: $(-1,3)$ *and* $(2,3)$ $(\,\mathbf{0.5}\,,\mathbf{3}\,)$	7. Find the midpoint of: $(-2, -1)$ *and* $(2,1)$ $(\,\mathbf{0}\,,\mathbf{0}\,)$
3. Find the midpoint of: $(1,2)$ *and* $(3,4)$ $(\,\mathbf{2}\,,\mathbf{3}\,)$	8. Find the midpoint of: $(77, -100)$ *and* $(-27, -144)$ $(\,\mathbf{25}\,,\mathbf{-122}\,)$
4. Find the midpoint of: $(-1, -1)$ *and* $(2,3)$ $(\,\mathbf{0.5}\,,\mathbf{1}\,)$	9. The midpoint of A and B is $(4,9)$. A is the point $(1,3)$ B is: $(\,\mathbf{7}\,,\mathbf{15}\,)$
5. Find the midpoint of: $(1,0)$ *and* $(0,3)$ $(\,\mathbf{0.5}\,,\mathbf{1.5}\,)$	10. The midpoint of A and B is $(-4,3)$. B is the point $(7, -3)$ A is: $(\,\mathbf{-15}\,,\mathbf{9}\,)$