

GCSE Maths: Midpoints and lengths of line segments (Foundation): worksheet

GCSE Maths - Straight-Line Graphs and Coordinates - Foundation - Lesson 12.2

Name: _____

Date: _____

Score: _____

20 questions. Write your answers in the spaces. Answers and step-by-step help are free at websink.site/gcse/maths/ch12-straight-line-graphs-coordinates/foundation/midpoints-and-lengths-of-line-segments/

Exercise 12B Midpoints Non-calculator

1 Find the midpoint of each line segment.

(a) A(2, 4), B(8, 10)

Answer: _____

(b) A(0, 6), B(10, 2)

Answer: _____

(c) A(1, 3), B(9, 7)

Answer: _____

(d) A(4, 2), B(12, 8)

Answer: _____

2 Find the number that is exactly halfway between each pair of numbers. (Use a number line if it helps.)

(a) 4 and 10

Answer: _____

(b) -2 and 6

Answer: _____

(c) -9 and -3

Answer: _____

(d) 1 and 4

Answer: _____

3 Find the midpoint of each line segment. Take care with the negative numbers.

(a) A(-4, 2), B(6, 8)

Answer: _____

(b) A(-7, -3), B(1, 5)

Answer: _____

(c) A(-2, 5), B(4, -1)

Answer: _____

(d) A(-8, -6), B(-2, -4)

Answer: _____

4 Find the midpoint of each line segment. The coordinates of the midpoint may be decimals.

(a) A(1, 2), B(6, 5)

Answer:

(b) A(-3, 4), B(2, -1)

Answer:

(c) A(0, -5), B(7, 0)

Answer:

(d) A(-1, 3), B(0, 6)

Answer:

5 Aisha lives at A(-6, 2) and Ben lives at B(4, 8) on a map where each unit is 1 km. They agree to meet at the point exactly halfway between their homes. Write the coordinates of the meeting point.

Answer:

6 AB is a diameter of a circle. A is (-5, 2) and B is (3, -4). Find the coordinates of the centre of the circle.

Answer:

7 Tom says the midpoint of (2, 6) and (8, -2) is (3, -4). Find his mistake and work out the correct midpoint.

Answer:

8 A is (-4, 6) and B is (8, -2). C is the midpoint of AB. D is the midpoint of AC. Find the coordinates of D.

Answer:

9 ABCD is a rectangle with A(-1, -2), B(5, -2), C(5, 4) and D(-1, 4).

(a) Find the midpoint of the diagonal AC.

Answer:

(b) Find the midpoint of the diagonal BD.

Answer:

(c) What do your answers show about the diagonals of a rectangle?

Answer:

10 A path joins a campsite at C(2, -3) to a lake at L(10, 5) on a map where each unit is 100 m. A bench B is halfway between the campsite and the lake. A second bench S is halfway between the first bench and the lake. Find the coordinates of B and S.

(a) the first bench B

Answer:

(b) the second bench S

Answer:

Exercise 12C Lengths of line segments Calculator allowed

1 Work out the exact length of each line segment. Each answer is a whole number.

(a) A(0, 0), B(3, 4)

Answer:

(b) A(1, 1), B(6, 13)

Answer:

(c) $A(-2, -1)$, $B(4, 7)$

Answer:

(d) $A(-3, 2)$, $B(2, 14)$

Answer:

2 A line segment joins $O(0, 0)$ to $P(6, 8)$.

(a) Write down the horizontal distance from O to P .

Answer:

(b) Write down the vertical distance from O to P .

Answer:

(c) Use Pythagoras to work out the length OP .

Answer:

3 Work out the length of each line segment. Give your answers correct to 1 decimal place.

(a) $A(-1, 3)$, $B(4, 5)$

Answer:

(b) $A(-3, -2)$, $B(2, 4)$

Answer:

(c) $A(2, -3)$, $B(7, 5)$

Answer:

(d) $A(-5, 1)$, $B(-1, -6)$

Answer:

4 A map uses a grid where each unit is 1 km. A harbour H is at $(0, 0)$, a lighthouse L is at $(5, 12)$ and a buoy B is at $(-4, 0)$. Find (a) the distance HL , (b) the distance LB , (c) the total distance of a trip from H to L and then to B .

(a) the distance HL

Answer:

(b) the distance LB

Answer:

(c) the total distance H to L to B

Answer:

5 The vertices of triangle ABC are $A(1, 1)$, $B(7, 1)$ and $C(7, 9)$. Work out the perimeter of the triangle.

Answer:

6 Which of the points $(3, -5)$ and $(-4, 4)$ is further from the origin? Show your working.

Answer:

7 A drone flies in a straight line from the point $(-2, 3)$ to the point $(10, 8)$ on a map. Each unit on the map is 100 m. How far does it fly?

Answer:

8 Two towns are at $A(-6, -2)$ and $B(6, 3)$ on a map where each unit is 1 km.

(a) How far apart are the towns?

Answer:

(b) A petrol station is halfway between the towns. Find its coordinates.

Answer:

9 Mia says the distance from (1, 2) to (4, 6) is 7, because $3 + 4 = 7$. Explain why she is wrong and find the correct distance.

Answer:

10 A boat sails in a straight line from $(-4, -3)$ to $(4, 3)$ on a map where each unit is 1 km. How far does the boat sail?

Answer: