MIDPOINTS OF LINE SEGMENTS

BUILDING BLOCKS

NAME _____ CLASS _____ DATE _____

KEY IDEA

The midpoint is exactly halfway.

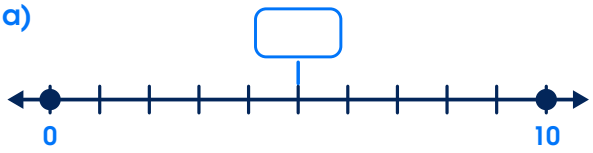
Add the two numbers, then halve:

(2 + 8) ÷ 2 = 10 ÷ 2 = 5

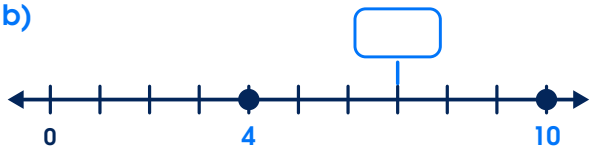


1 Find the number halfway between the two dots.

a)



b)



2 Halve each number.

half of 14 = ☐ **half of 9 =** ☐ **half of 20 =** ☐ **half of 7 =** ☐

3 Find the number halfway between each pair.

4 and 10 ☐ **0 and 12** ☐ **3 and 9** ☐ **6 and 7** ☐

Add them, then halve.

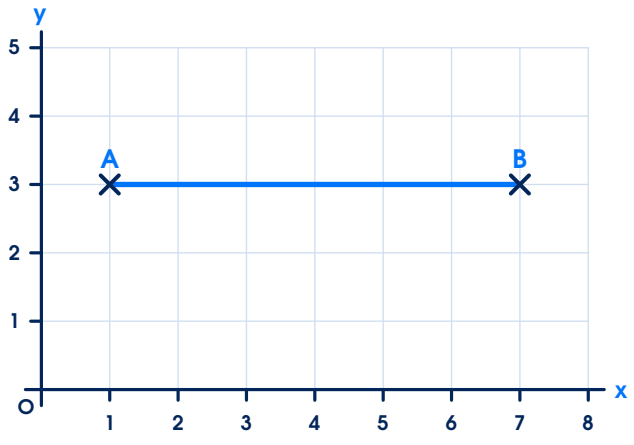
4 Look at the line segment AB.

a) Write the coordinates of A and B.

A (,) B (,)

b) Mark the midpoint of AB with a cross.

c) The midpoint is (,)



MIDPOINTS OF LINE SEGMENTS

SUPPORT

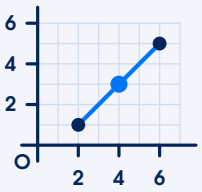
NAME _____ CLASS _____ DATE _____

KEY IDEA

Midpoint = (halfway between the x-values, halfway between the y-values)

(2, 1) and (6, 5): x: (2 + 6) ÷ 2 = 4 y: (1 + 5) ÷ 2 = 3

So the midpoint is (4, 3).

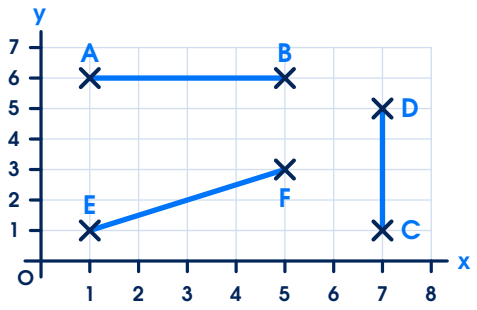


1 Find the midpoint of each line segment.

Midpoint of AB (,)

Midpoint of CD (,)

Midpoint of EF (,)



2 Find the midpoint of each pair of points.

a) **(2, 4) and (8, 10)** (,)

b) **(1, 3) and (5, 9)** (,)

c) **(0, 7) and (6, 1)** (,)

3 Use the number line. Find the number halfway between each pair.



−6 and 2 ☐ **−5 and −1** ☐ **−3 and 4** ☐

4 Amy says the midpoint of (2, 6) and (8, 4) is (4, 6), because (2 + 6) ÷ 2 = 4 and (8 + 4) ÷ 2 = 6. Explain her mistake.

The correct midpoint is (,)

MIDPOINTS OF LINE SEGMENTS

CORE

NAME _____ CLASS _____ DATE _____

KEY IDEA

Midpoint = (mean of the two x-values, mean of the two y-values). Take care with negatives.

FLUENCY

1 Find the midpoint of each pair of points.

a) **(–4, 2) and (6, 8)** (,)

b) **(–3, –5) and (1, 3)** (,)

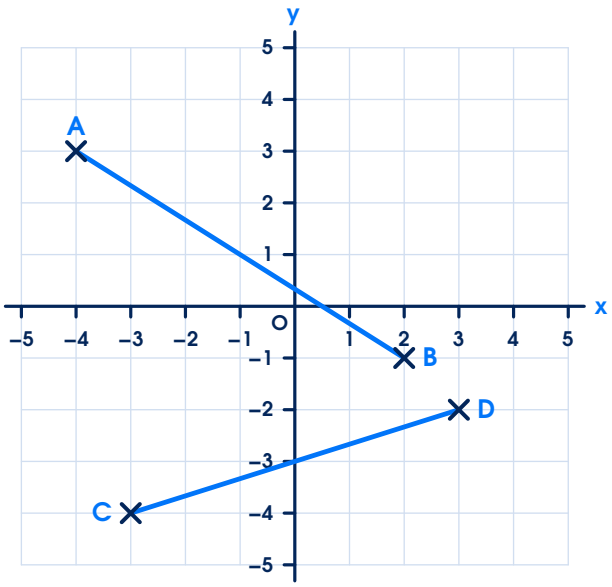
c) **(2, –7) and (–6, 1)** (,)

d) **(0.5, 4) and (3.5, –2)** (,)

2 Find the midpoint of each line segment.

Midpoint of AB (,)

Midpoint of CD (,)



REASONING

3 P is (–2, 3) and Q is (10, 9).

a) Find the midpoint of PQ. (,)

b) Find the point one quarter of the way from P to Q. (,)

4 What do you know about the midpoint of (2, a) and (2, b)? Explain how you know.

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MIDPOINTS OF LINE SEGMENTS

GREATER DEPTH

NAME _____ CLASS _____ DATE _____

REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) The midpoint of a line segment has whole-number coordinates. ALWAYS SOMETIMES NEVER

b) The midpoint of (a, b) and (–a, –b) is the origin. ALWAYS SOMETIMES NEVER

c) If both ends are in the 1st quadrant, so is the midpoint. ALWAYS SOMETIMES NEVER

d) The midpoint of a segment from the 2nd to the 4th quadrant is (0, 0). ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 ABCD is a parallelogram. A is (1, 1), B is (5, 2) and C is (7, 6).

a) Find the midpoint of AC. (,)

b) The diagonals of a parallelogram cross at their midpoints. Find D. (,)

3 M is the midpoint of the line segment AB. Find the coordinates of B.

a) **M (3, 1) and A (–1, 4)** **B =** (,)

b) **M (–2, 0) and A (1, 5)** **B =** (,)

★ CHALLENGE FOR ALL

4 The midpoint of (2a, 6) and (8, 2b) is (7, a).

a) Find a. **b)** Find b.

MIDPOINTS OF LINE SEGMENTS

ANSWERS

BUILDING BLOCKS

1 a) 5 · b) 7
2 7 · 4.5 · 10 · 3.5
3 7 · 6 · 6 · 6.5
4 a) A (1, 3), B (7, 3) · b) cross at (4, 3) · c) (4, 3)

SUPPORT

1 AB (3, 6) · CD (7, 3) · EF (3, 2)
2 a) (5, 7) · b) (3, 6) · c) (3, 4)
3 −2 · −3 · 0.5
4 She found the mean of the numbers inside each pair. Use both x-values and both y-values: (2 + 8) ÷ 2 = 5 and (6 + 4) ÷ 2 = 5, so the midpoint is (5, 5).

CORE

1 a) (1, 5) · b) (−1, −1) · c) (−2, −3) · d) (2, 1)
2 AB (−1, 1) · CD (0, −3)
3 a) (4, 6) · b) (1, 4.5): the midpoint of P and (4, 6)
4 Its x-coordinate is 2 (both ends have x = 2, the segment is vertical) and its y-coordinate is (a + b) ÷ 2.

GREATER DEPTH

1 a) Sometimes: (1, 2) and (2, 2) give (1.5, 2) · b) Always · c) Always: the mean of two positive numbers is positive · d) Sometimes: (−2, 3) and (2, −3) give (0, 0); (−2, 3) and (4, −1) give (1, 1)
2 a) (4, 3.5) · b) D = (3, 5): the midpoint of BD must also be (4, 3.5)
3 a) (7, −2) · b) (−5, −5)
4 (2a + 8) ÷ 2 = 7 so a = 3 · (6 + 2b) ÷ 2 = a = 3 so b = 0