Midpoint, Meeting in the Middle

Midpoint: average the x's, average the y's, as stacked fractions. Missing endpoint: the step way (take the step once more) or the equation way (set the average equal and solve).

Name _____ Date _____

Words we use

say the math word, then the plain English

WORD	PLAIN ENGLISH	WHAT YOU DO
Midpoint	The point exactly halfway along a segment.	Average the x's, average the y's.
Endpoint	A point at either end of a segment.	Given the midpoint and one endpoint, step once more to find the other.
Bisect	To cut into two equal parts.	The midpoint bisects the segment.
Mean (average)	Add them and divide by how many.	For two numbers: add and divide by 2.
Ratio	A comparison of two amounts. Here 1 to 1, because the halves are equal.	Each half is the same length.
The step way	The step from the endpoint to the midpoint, taken one more time.	Count across and up, then repeat it.

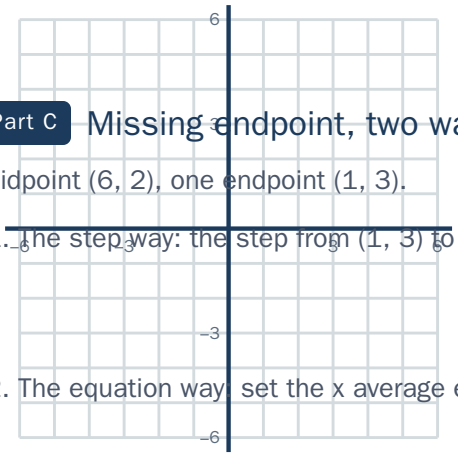
Part A Number lines first

BETWEEN	ADD	DIVIDE BY 2
2 and 8		
–4 and 10		
3 and 10		

Part B Find the midpoint

ENDPOINTS	AVERAGE OF THE X'S	AVERAGE OF THE Y'S	MIDPOINT
(2, 8) and (6, 4)			
(9, 7) and (15, 9)			
(–3, 5) and (5, –1)			
(0, 0) and (7, 3)			

Plot (2, 8) and (6, 4), draw the segment, and mark the midpoint. Count the halves: are they the same?



Part C Missing endpoint, two ways

Midpoint (6, 2), one endpoint (1, 3).

1. The step way: the step from (1, 3) to (6, 2) is ____ right and ____ down. One more step lands on:
2. The equation way: set the x average equal to 6 and solve. Then the y.

3. Check: the midpoint of (1, 3) and your answer.

Part D Negatives and decimals

Midpoint (–1, –2), one endpoint (3.5, –7). Find the other endpoint by either way, then check.

Part E In your own words

1. Why is the midpoint's x the average of the two x's?

2. Why does the order of the endpoints not matter?

3. What does 1 to 1 ratio mean here?

Part F Exit ticket

1. Midpoint of (2, 8) and (6, 4).

2. Midpoint (6, 2), endpoint (1, 3): the other endpoint, and which way you used.

Answer key

Part A. 10, 5. 6, 3. 13, 6.5.

Part B. 4, 6, (4, 6). 12, 8, (12, 8). 1, 2, (1, 2). 3.5, 1.5, (3.5, 1.5). The halves are the same length.

Part C. 1. 5 right, 1 down; (11, 1). 2. 1 + x over 2 = 6, so x = 11; 3 + y over 2 = 2, so y = 1. 3. (6, 2).

Part D. (–5.5, 3). Check: (3.5 + (–5.5)) over 2 = –1 and (–7 + 3) over 2 = –2.

Part E. 1. Halfway between two numbers is their mean. 2. Adding goes in any order. 3. The two halves are equal.

Part F. 1. (4, 6). 2. (11, 1), by either way.