Write your questions here!
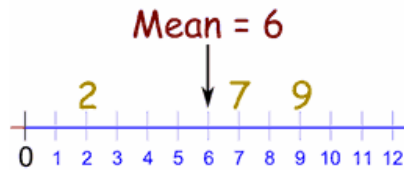
Unit 7.1 – Coordinate Geometry (Midpoint)

1ˢᵗ video

Review: How to find average *(a.k.a. the "mean")*

Mean = 6

2   7   9

0 1 2 3 4 5 6 7 8 9 10 11 12

A calculated "central" value of a set of numbers.

To calculate: add up all the numbers, then divide by how many numbers there are.

Example: what is the average of 2, 7 and 9?

Add the numbers: 2 + 7 + 9 = 18

Divide by how many numbers (i.e. we added 3 numbers): 18 ÷ 3 = 6

So the average is 6

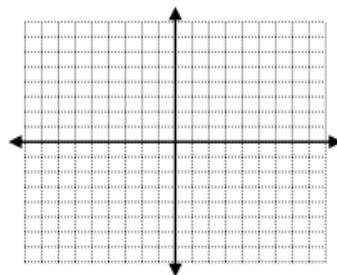What is the average of the following number set? $\{2,3,4,7,1\}$

2ⁿᵈ video

Review: The **midpoint** of a segment is a point that divides a segment into 2 congruent segments.
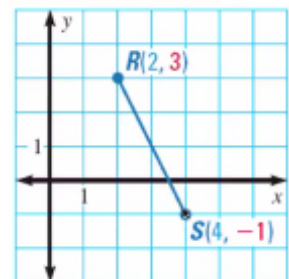
Coordinate Geometry

EASY

$A\ (-5,3)$

$B\ (-1,3)$

Midpoint of $\overline{AB}$ =

LESS EASY

$R(2,3)$

$S(4,-1)$

R(2, 3)

1

1   x

S(4, −1)

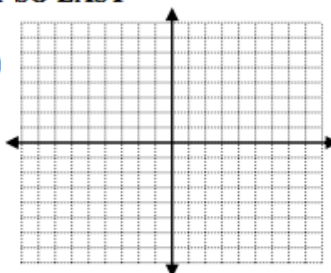**Midpoint of $\overline{RS}$ =**

NOT SO EASY

$C\ (-6,-5)$

$D\ (7,3)$

Midpoint of $\overline{CD}$ =

The **Midpoint Formula** is

$$M = \left(\underline{\quad\quad} , \underline{\quad\quad} \right)$$

FIND ENDPOINT The midpoint of $\overline{JK}$ is $M(2, 1)$. **One endpoint is** $J(1, 4)$. **Find the coordinates of endpoint** K.
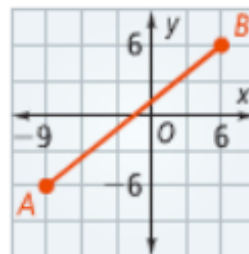
y-axis

x-axis
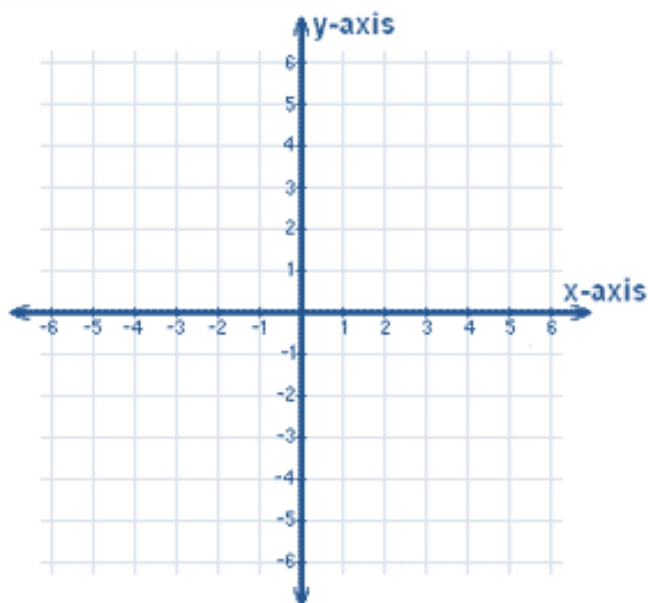
PRACTICE

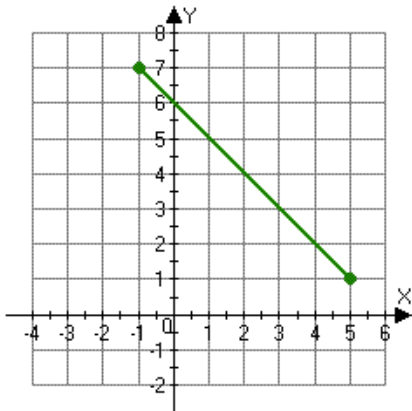| Find the midpoint given the two endpoints.		
1. (12,15) and (-8, -22)	2. (-3,5) and (14, 28)	3. Find the midpoint between A and B.

Find the midpoint given the two endpoints.

4. (-1,7), (5,1)	5. (14,-8) and (4,12)	6. (9.3, 9.4), (8.3, −8.7)

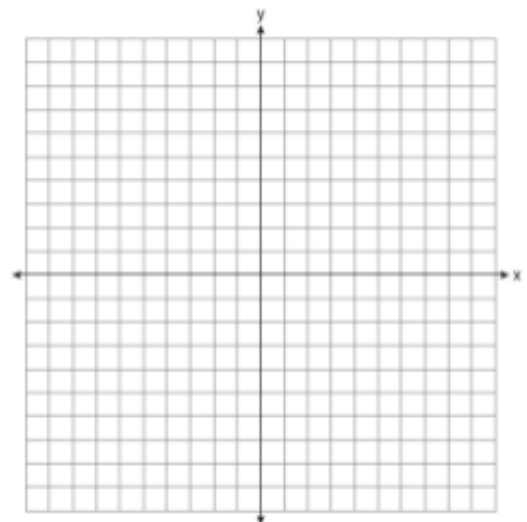| 7. (6.6, 8.52), (−5.5, 4.07)	8. (3a, -b) and (a, b)	9. (4a, d) and (6a, 3d)

10.

If you know that the endpoint of a segment is (2,3) and its midpoint is (4,7), is it possible to find the other endpoint? (try graphing the points out to try to answer this)
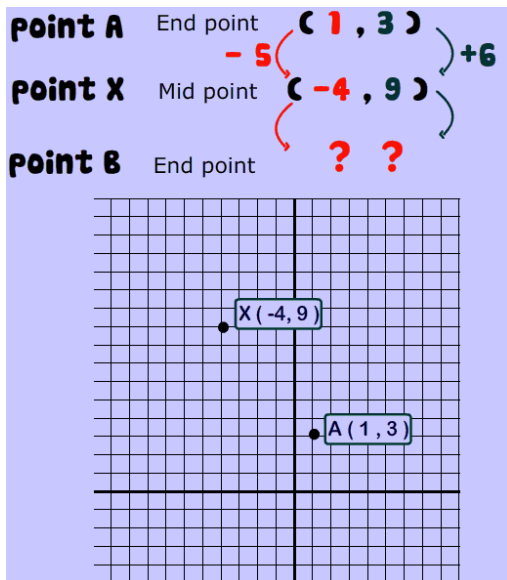
If so, what is the other endpoint?

_____

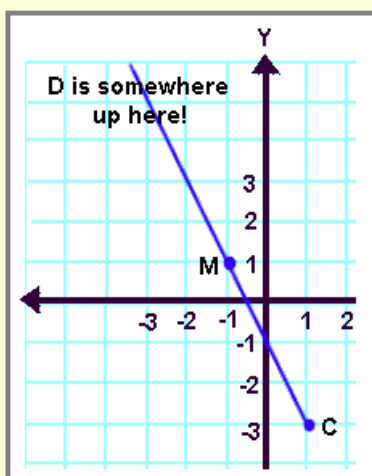11. If the midpoint of a line is (4, 1) and an endpoint is (8, 1), what is its other endpoint?
(a) (3, 5)
(b) (4, 0)
(c) (0, 1)
(d) (-4, 1)

Find the other endpoint given the midpoint and one endpoint.

12.

Point A   End point   (**1** , **3**)
            − **5** (   ) +6

Point X   Mid point   (−**4** , **9**)

Point B   End point   **? ?**

13. M is the midpoint of $\overline{CD}$. The coordinates M(-1,1) and C(1,-3) are given.

Find the coordinates of point D.

14. The midpoint of $\overline{WV}$ is $M(-1, -2)$. One endpoint is $W(4, 4)$.

Find the coordinates of endpoint V.

15. The endpoints of $\overline{AB}$ are $A(1, 2)$ and $B(7, 8)$.

Find the coordinates of the midpoint M.

16. The midpoint of line segment $\overline{AB}$ is M. The coordinates of M are (3, -2) and the coordinates of A are (-1, 0). What are the coordinates of B?

17. The coordinates of the midpoint of a segment are (3, 7). If the coordinates of one endpoint are (-2, 4), find the coordinates of the other endpoint.

18. The midpoint M of $\overline{AB}$ has coordinates (4, 9). If the coordinates of A are (2, 8), what are the coordinates of B?

19. If the midpoint of a line segment is (-5, -2) and one endpoint is (-2, -2), what is the other endpoint?
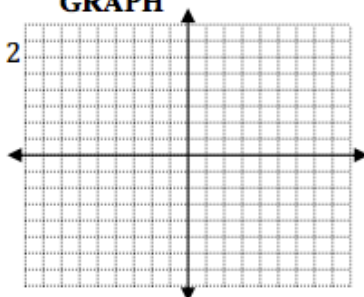
ALGEBRA REVIEW

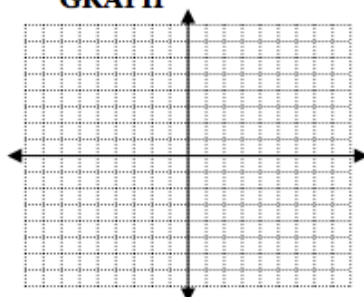| SOLVE	GRAPH	MULTIPLY
$2 + \dfrac{x}{3} = 10$	$y = -\dfrac{3}{4}x - 2$	(distribute) $-2(2x - 3)$
SOLVE $3 + 2y = 5y - 9$	GRAPH $x = 4$	FACTOR Factor out the greatest common factor (undistribute) $9x^2 + 12$

APPLICATION

1. A player kicks a soccer ball from a position that is 10 yards from a sideline and 5 yards from a goal line. The ball lands at a position that is halfway to his teammate, who is 45 yards from the same goal line and 40 yards from the same sideline. Where did the ball end up?
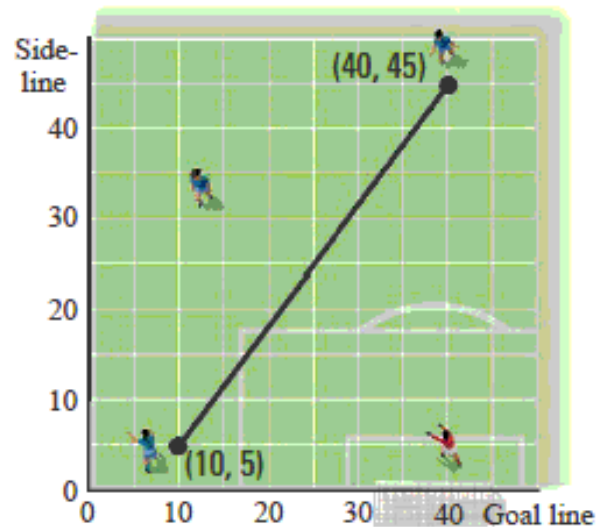
2. Michael and Sarah live in separate cities and one day they decided to meet up for lunch. Because they both wanted to travel as little as possible they decided to meet at a point halfway between their homes. If Michael's position can be given by $(3100,500)$ and Sarah's position by $(5120,125)$, what coordinate should they meet?

3. You are designing a video game about pirates. You want to place the buried treasure halfway between the center of the base of the palm tree and the corner of the large boulder. Find where you should place the treasure chest.