

Tuesday, September 2

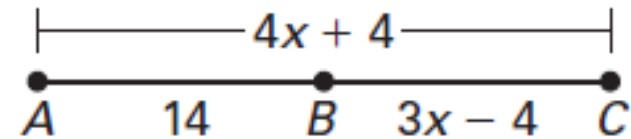
Objective

SWBAT-

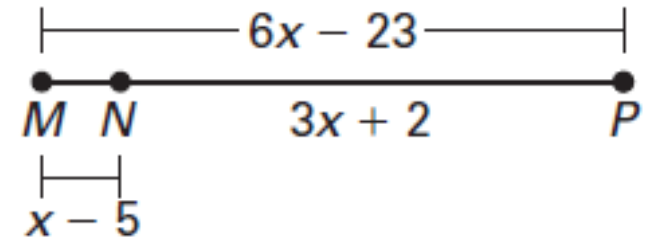
- Develop and apply the formula for midpoint.

DO NOW

- ① Find AC .



- ② Find NP .



HW: p19-20 #14-20 even, 23, 26, 28

1.3 Midpoint and Distance Formulas

Agenda:

- **Do Now** (7 min)
 - ✓ Work and Solve
- **Introduction to New Material** (10 min)
 - ✓ Formulating the Midpoint Formula, Segment bisectors
- **Guided Practice** (12 min)
 - ✓ Finding the midpoint of segments
- **Independent Practice** (12 min)
 - ✓ Distributive property and combining like terms
- **Exit Ticket** (5 min)
 - ✓ Top Ten Results

1.3 Midpoint and Distance Formulas

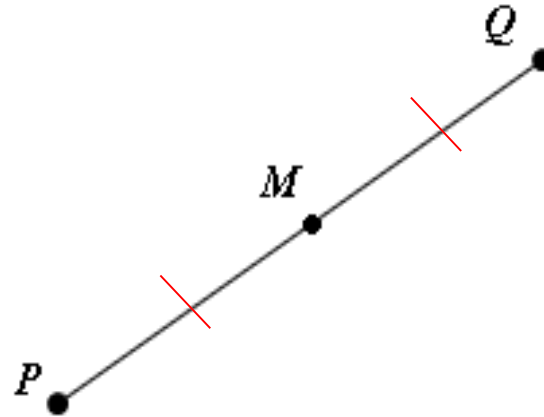
What do you think a midpoint is?

Write down a quick definition and discuss it with your partner.

The **midpoint** of a segment is the point that divides the segment into two congruent segments.

1.3 Midpoint and Distance Formulas

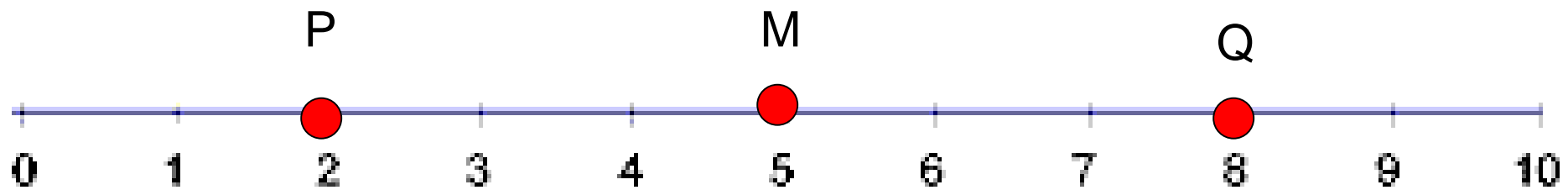
Which point do you think is the midpoint in the picture to the right?



How do you know for sure it's the midpoint?

1.3 Midpoint and Distance Formulas

So, M is the midpoint. What if the points were on a number line? P was located at 2 and Q was located at 8. Where would M be located?



How did you know where M was located?

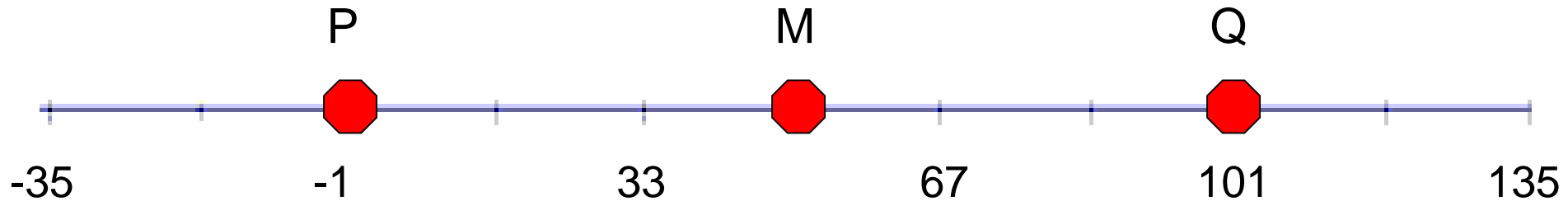
How can you use math to find out M's location?

Some people may have just counted to find M,

But what if the numbers were so big, it was hard to count....

1.3 Midpoint and Distance Formulas

- If M was still a midpoint, how could we use math to find it's location now?

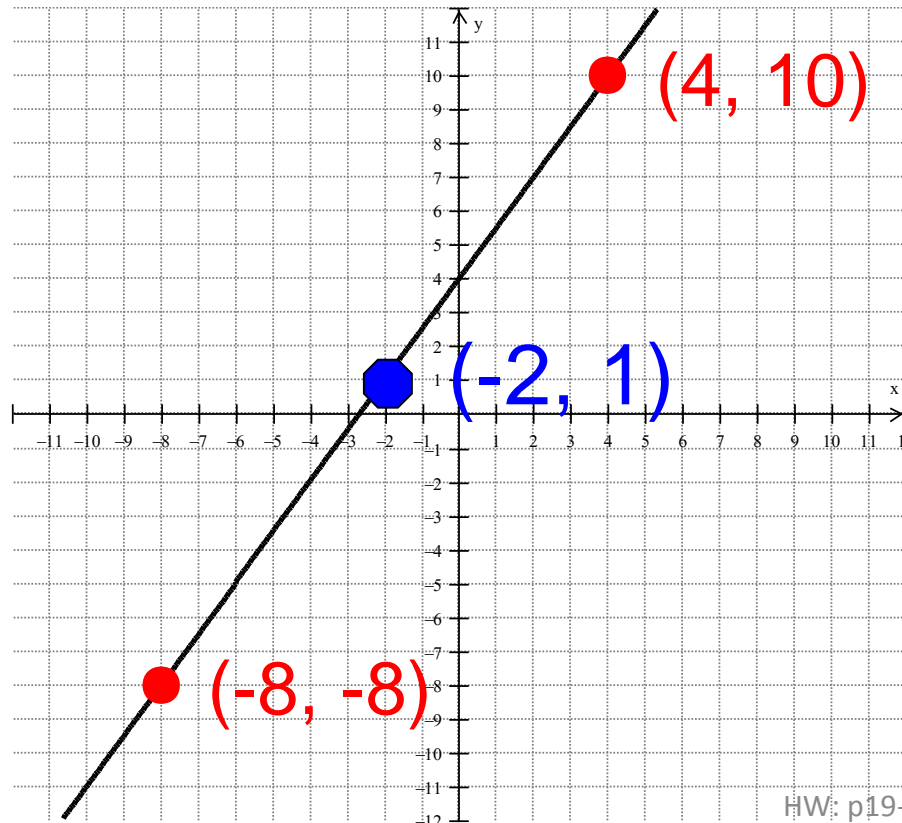


If you are still stuck, let's relate it to your grades. Say you got a 90 on one paper and a 70 on another paper. What would your final grade be?

How did you use your math to get your final grade?

1.3 Midpoint and Distance Formulas

What if we moved to 2-D? How would we find a midpoint on a coordinate plane without counting?



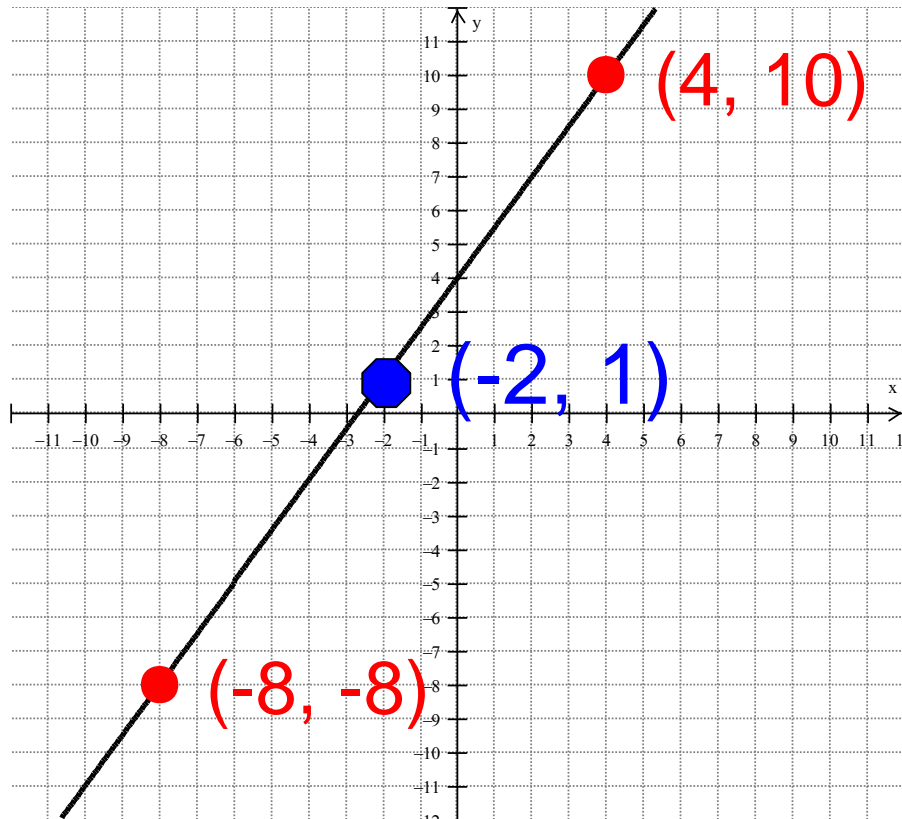
If you are stuck, estimate where you think the midpoint is.

Did you get $(-2, 1)$?

How can you use math to get these coordinates?

1.3 Midpoint and Distance Formulas

Just **AVERAGE!!!**



Average your x values:

$$\frac{-8 + 4}{2} = -2$$

Then average your y values:

$$\frac{-8 + 10}{2} = 1$$

ANSWER: (-2, 1)

1.3 Midpoint and Distance Formulas

Midpoint Formula

(The average of the x's and the average of the y's)

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

1.3 Midpoint and Distance Formulas

The endpoints of \overline{RS} are R(1, -3) and S(4, 2). Find the coordinates of the midpoint M.

$$R(1, -3)$$

$$S(4, 2)$$

$$\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}$$

$$\frac{1 + 4}{2}, \frac{-3 + 2}{2}$$

$$\frac{5}{2}, \frac{-1}{2} \quad (2.5, -0.5)$$

1.3 Midpoint and Distance Formulas

Find the coordinates of the midpoint of the segment with the given endpoints.

$$S(4, -1) \text{ and } T(6, 0)$$

$$L(4, 2) \text{ and } P(0, 2)$$

$$. \quad H(-5, 5) \text{ and } I(7, 3)$$

$$G(-2, -8) \text{ and } H(-3, -12)$$

1.3 Midpoint and Distance Formulas

Find the coordinates of the midpoint of the segment with the given endpoints.

$$S(4, -1) \text{ and } T(6, 0)$$

$$(5, -.5)$$

$$L(4, 2) \text{ and } P(0, 2)$$

$$(2, 2)$$

$$H(-5, 5) \text{ and } I(7, 3)$$

$$(1, 4)$$

$$G(-2, -8) \text{ and } H(-3, -12)$$

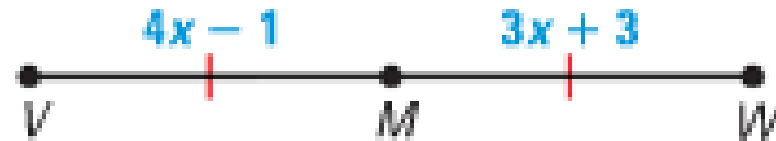
$$(-2.5, -10)$$

1.3 Midpoint and Distance Formulas

A **segment bisector** is a point, ray, line, line segment, or plane that intersects the segment at its midpoint. A midpoint or a segment bisector bisects a segment.

1.3 Midpoint and Distance Formulas

Point M is the midpoint of \overline{VW} . Find the length of \overline{VM}



$$\overline{VM} = 4x - 1$$

$$\overline{VM} = \overline{MW}$$

$$\overline{VM} = 4(4) - 1$$

$$4x - 1 = 3x + 3$$

$$\overline{VM} = 15$$

$$x - 1 = 3$$

$$+1 \quad +1$$

$$x = 4$$

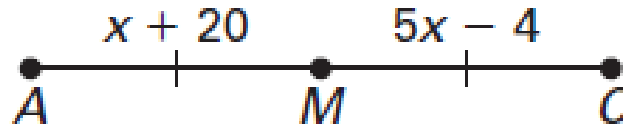
1.3 Midpoint and Distance Formulas

Find LN .



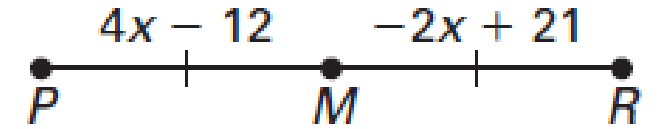
$$x = 3$$
$$LN = 24$$

Find AM .



$$x = 6$$
$$AM = 26$$

Find MR .



$$x = 5.5$$
$$MR = 10$$

1.3 Midpoint and Distance Formulas

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

$$\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} = (2, 1) \qquad J(1, 4)$$

$$\frac{x_1 + x_2}{2} = 2$$

$$\frac{y_1 + y_2}{2} = 1$$

$$\frac{1 + x_2}{2} = 2$$

$$\frac{4 + y_2}{2} = 1$$

1.3 Midpoint and Distance Formulas

$$\frac{1 + x_2}{2} = 2$$

$$1 + x_2 = 4$$

$$x_2 = 3$$

$$\frac{4 + y_2}{2} = 1$$

$$4 + y_2 = 2$$

$$y_2 = -2$$

1.3 Midpoint and Distance Formulas

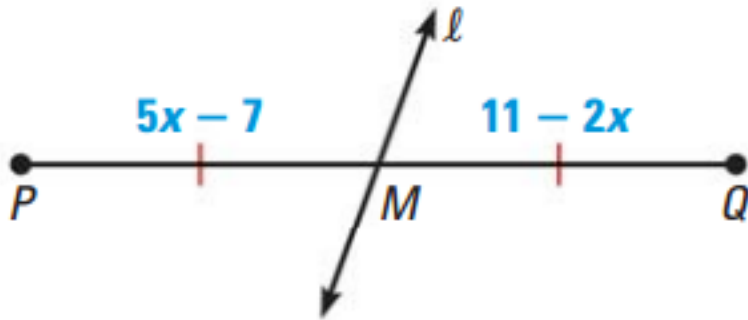
M is the midpoint of \overline{XY} . X has coordinates (2,7) and M has coordinates (6,1). Find the coordinates of Y.

S is the midpoint of \overline{RT} . R has coordinates (-6,-1), and S has coordinates (-1,1). Find the coordinates of T.

1.3 Midpoint and Distance Formulas

EXIT TICKET

Find PQ



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

Find the coordinates of endpoint V