Main Ideas/Questions	Notes
What is a "Radical"?	another word for the "square root" symbol

Simplifying Perfect Square Root Radicals	1. $\sqrt{4}$ 2	2. $\sqrt{81}$ 9
	3. $\sqrt{256}$ 16	4. $\sqrt{121}$ 11
	5. $\sqrt{324}$ 18	6. $\sqrt{1}$ 1
	7. $\sqrt{\frac{64}{81}}$ $\frac{8}{9}$	8. $\sqrt{\frac{1}{16}}$ $\frac{1}{4}$
	9. $\sqrt{\frac{9}{100}}$ $\frac{3}{10}$	10. $\sqrt{\frac{25}{49}}$ $\frac{5}{7}$

Simplifying Non-Perfect Square Root Radicals

To simplify non-perfect square roots, you need to know at least your first 10 perfect square numbers:

$$1, 4, 9, 16, 25, 36, 49, 64, 81, 100$$

(Find the **greatest perfect square** that goes into the radical)

11. $\sqrt{24}$

$$\sqrt{4 \cdot 6}$$
$$\sqrt{4} \cdot \sqrt{6}$$
$$2\sqrt{6}$$

12. $\sqrt{48}$

$$\sqrt{16 \cdot 3}$$
$$\sqrt{16} \cdot \sqrt{3}$$
$$4\sqrt{3}$$

13. $\sqrt{72}$

$$\sqrt{36 \cdot 2}$$
$$\sqrt{36} \cdot \sqrt{2} \quad 6\sqrt{2}$$

14. $\sqrt{90}$

$$\sqrt{9 \cdot 10}$$
$$\sqrt{9} \cdot \sqrt{10}$$
$$3\sqrt{10}$$

$$\sqrt{9 \cdot 8}$$
$$\sqrt{9} \cdot \sqrt{8}$$
$$3\sqrt{8}$$
$$\sqrt{4} \cdot \sqrt{2}$$
$$3(2\sqrt{2})$$
$$6\sqrt{2}$$

15. $\sqrt{175}$

$$\sqrt{25 \cdot 7}$$
$$\sqrt{25 \cdot 7} \quad 5\sqrt{7}$$

16. $\sqrt{162}$

$$\sqrt{81 \cdot 2}$$
$$\sqrt{81} \cdot \sqrt{2} = 9\sqrt{2}$$

17. $\sqrt{117}$

$$\sqrt{9 \cdot 13}$$
$$3\sqrt{13}$$

18. $\sqrt{245}$

$$\sqrt{49 \cdot 5}$$
$$\sqrt{49 \cdot 5} = 7\sqrt{5}$$

21. $\sqrt{63}$

$$\sqrt{9 \cdot 7}$$
$$\sqrt{9} \cdot \sqrt{7}$$
$$3\sqrt{7}$$

22. $\sqrt{216}$

$$\sqrt{36 \cdot 6}$$
$$\sqrt{36} \cdot \sqrt{6}$$
$$6\sqrt{6}$$

What are some takeaways from the midpoint formula notes?

- division by 2
- $\left(\dfrac{x_1+x_2}{2}, \dfrac{y_1+y_2}{2}\right)$

Find the midpoint between (-11, -10) and (8,-17).

$$\dfrac{-11+8}{2}, \dfrac{-10+(-17)}{2}$$

$$\left(\dfrac{-3}{2}, \dfrac{-27}{2}\right) = (-1.5, -13.5)$$

The Big IDEA!

What are some takeaways from the distance formula notes?

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

one number

Find the distance between $\overset{x_1 \quad y_1}{(-11, -10)}$ and (-17, 8). *Write your answer as a simplified radical and decimal.*

$$-17 - (-11)$$
$$-17 + 11$$

$$d = \sqrt{(-17 + 11)^2 + (8 + 10)^2}$$

$$d = \sqrt{(-6)^2 + (18)^2}$$

$$d = \sqrt{36 + 324}$$

$$d = \sqrt{360}$$

$$= \sqrt{36} \cdot \sqrt{10}$$
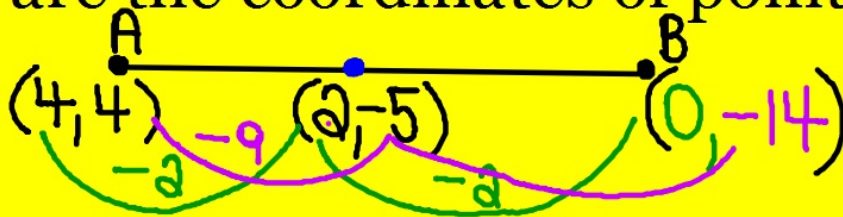
$$d = 6\sqrt{10}$$

$$d = 18.97$$

Midpoint and Distance Practice

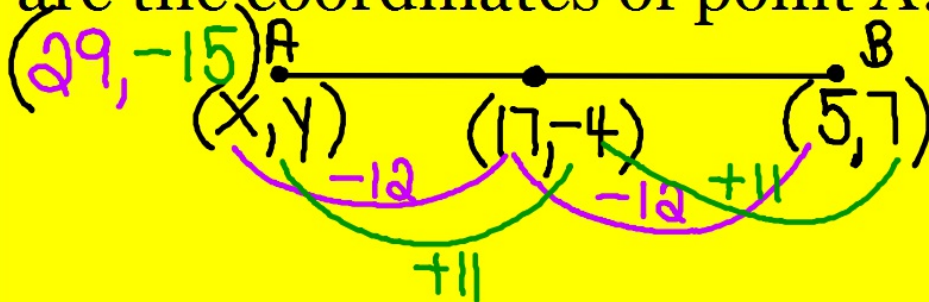$$\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right) \qquad d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}$$

Find the midpoint and distance between (-2, 5) and (5, -2).

Missing Endpoints

The midpoint of line segment AB is (2, -5).
If the coordinates of point A are (4,4),
what are the coordinates of point B?

A ●————————●———————————● B
(4,4) -2 (2,-5)   (0, -14)
    -9   -2

Point A is (x,y) and Point B is (5, 7). If the
midpoint of segment AB is (17, -4), what
are the coordinates of point A?

(29, -15) A ●——————————●——————————● B
(x,y)   (17,-4)   (5,7)
    -12   +11   -12   +11
    +11

Missing Coordintate
Distance Formula

Find y if the distance between $(3, 5)$ and $(-2, y)$ is $\sqrt{34}$

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$\sqrt{34} = \sqrt{(-2-3)^2 + (y-5)^2}$$

$$\sqrt{34} = \sqrt{(-5)^2 + (y-5)^2}$$

$$(\sqrt{34})^2 = (\sqrt{25 + (y-5)^2})^2$$

$$34 = 25 + (y-5)^2$$
$$-25 \quad -25$$

$$\sqrt{9} = \sqrt{(y-5)^2} \qquad -3 = y - 5$$
$$\qquad\qquad\qquad\qquad +5 \qquad +5$$

$$3 = y - 5 \qquad\qquad 2 = y$$
$$+5 \qquad +5$$

$$y = 8$$

Find the value of a if the distance between the points at $(7, 5)$ and $(a, -3)$ is 10 units.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$10 = \sqrt{(a-7)^2 + (-3-5)^2}$$

$$10 = \sqrt{(a-7)^2 + (-8)^2}$$

$$(10)^2 = (\sqrt{(a-7)^2 + 64})^2$$

$$100 = (a-7)^2 + 64$$
$$-64 \qquad\qquad -64$$

$$\pm\sqrt{36} = \sqrt{(a-7)^2}$$

$$6 = a - 7 \qquad\qquad -6 = a - 7$$
$$+7 \quad +7 \qquad\qquad +7 \quad +7$$

$$13 = a \qquad\qquad\qquad 1 = a$$

Complete Practice 3.1 - Finding Midpoints and Endpoints of Line Segments

For #6 - 10, find the distance between the two points as well.