Do Now: Find the square root of each number.

1) 169

2) 100

3) 64

4) 121

Do Now:

1. A construction worker building a skyscraper accidently drops a hammer from a height of 1600 feet. Use the equation $d = 16t^2$ to determine the time t in seconds that it takes the bolt to fall to the ground below. *10 seconds*

2. Solve the equation. Round to the nearest tenth if necessary (use calculators).

    a. $2x^2 = 32$ $x = \pm 4$

    b. $90 = 1.52t^2 + 8$ $1.52t^2 + 8 = 90$ $x = \pm 7.3$

    c. $5n^2 - 4 = 74$ $x = \pm 3.9$

52, 62, 50, 60, 64, 46, 48

(46) $\sqrt{y^2} = \sqrt{676}$

$y = \pm 26$

(48) $\sqrt{n^2} = \sqrt{576}$

$n = \pm 24$

(50) $\sqrt{c^2} = \sqrt{125}$

$c = \pm 11.2$

(52) $\dfrac{200}{16} = \dfrac{16t^2}{16}$

$\sqrt{12.5} = \sqrt{t^2}$

$\pm 3.5 = t$

---

(60)

$15 = 2h^2 - 3$

$+3 \qquad\qquad +3$

$\dfrac{18}{2} = \dfrac{2h^2}{2}$

$\sqrt{9} = \sqrt{h^2}$

$\pm 3 = h$

(62)

$1400 = 10z^2 + 2$

$-2 \qquad\qquad -2$

$\dfrac{1398}{10} = \dfrac{10z^2}{10}$

$\sqrt{139.8} = \sqrt{z^2}$

$\pm 11.8 = z$

---

(64)

$1.5n^2 + 7 = 20$

$\qquad -7 \quad -7$

$\dfrac{1.5n^2}{1.5} = \dfrac{13}{1.5}$ $\dfrac{130}{15}$

$\sqrt{n^2} = \sqrt{8.7}$

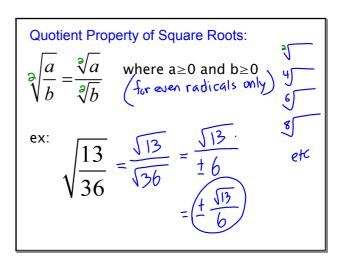$n = \pm 2.9$

9.2 Simplifying Square Roots

7.NS
8.EE

- SWBAT simplify radical expressions.
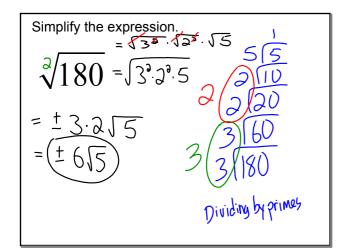- SWBAT understand numbers; understand ways of representing numbers.

- Calculators: No

A radical expression is in <u>simplest form</u> when:
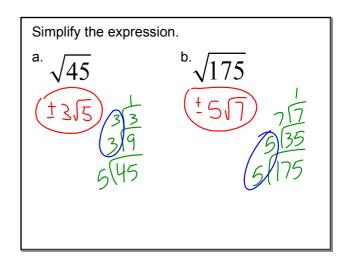
- No factor under the radical sign has any perfect square factor other than 1

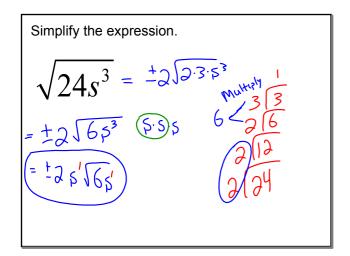- No fractions under the radical sign

- No radical sign in the denominator

Product Property of Square Roots:

$$\sqrt{ab} = \sqrt{a} * \sqrt{b} \quad \text{where } a \geq 0 \text{ and } b \geq 0$$

(for even radicals) $\sqrt[4]{}$

$\sqrt[6]{}$

etc.

ex: $\sqrt{63} = \sqrt{9 \cdot 7}$

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

$= \boxed{\pm 3\sqrt{7}}$

$\sqrt{63} = \sqrt{3^2 \cdot 7}$

$\quad 7\sqrt{7}$

$\boxed{\pm 3\sqrt{7}}$

$= \sqrt{3^2} \cdot \sqrt{7}$

$\quad 3\sqrt{21}$

$= \pm 3\sqrt{7}$

$\quad 3\sqrt{63}$

Quotient Property of Square Roots:

$$\sqrt[2]{\frac{a}{b}} = \frac{\sqrt[2]{a}}{\sqrt[2]{b}} \quad \text{where } a \geq 0 \text{ and } b \geq 0$$

(for even radicals only) $\sqrt[2]{}$

$\sqrt[4]{}$

$\sqrt[6]{}$

$\sqrt[8]{}$

etc

ex: $\sqrt{\dfrac{13}{36}} = \dfrac{\sqrt{13}}{\sqrt{36}} = \dfrac{\sqrt{13}}{\pm 6}$

$= \boxed{\pm \dfrac{\sqrt{13}}{6}}$

Simplify the expression.

$$\sqrt[2]{180} = \sqrt{3^2 \cdot 2^2 \cdot 5}$$
$$= \sqrt{3^2} \cdot \sqrt{2^2} \cdot \sqrt{5}$$
$$= \pm 3 \cdot 2\sqrt{5}$$
$$= \pm 6\sqrt{5}$$

$$5\overline{)5}$$ → 1
$$2\overline{)10}$$ → 5
$$2\overline{)20}$$ → 2
$$3\overline{)60}$$ → 3
$$3\overline{)180}$$ → 3

2, 3

Dividing by primes

Simplify the expression.

a. $\sqrt{45}$ b. $\sqrt{175}$

$\pm 3\sqrt{5}$ $\pm 5\sqrt{7}$

$$3\overline{)3}$$ → 1
$$3\overline{)9}$$ → 3
$$5\overline{)45}$$ → 3

$$7\overline{)7}$$ → 1
$$5\overline{)35}$$ → 7
$$5\overline{)175}$$ → 5

Simplify the expression.

$$\sqrt{24s^3} = \pm 2\sqrt{2 \cdot 3 \cdot s^3}$$
$$= \pm 2\sqrt{6s^3} \qquad (s \cdot s)s$$
$$= \pm 2s\sqrt{6s}$$

Multiply
$$6 < \begin{matrix} 3 \\ 2 \cdot 6 \end{matrix}$$

$$3\overline{)3}$$ → 1
$$2\overline{)6}$$ → 3
$$2\overline{)12}$$ → 2
$$2\overline{)24}$$ → 2

Simplify the expression.

a. $\sqrt{72t^5}$ b. $\sqrt{338b^7a^2}$

$$= \pm 3 \cdot 2\sqrt{2t^5}$$
$$= \pm 6\sqrt{2t^5}$$
$$= \pm 6t^2\sqrt{2t}$$

$5 \div 2 = 2 R 1$

$\pm 13\sqrt{2b^7a^2}$

$$3\overline{)3}$$ → 1
$$3\overline{)9}$$
$$2\overline{)18}$$
$$2\overline{)36}$$
$$2\overline{)72}$$
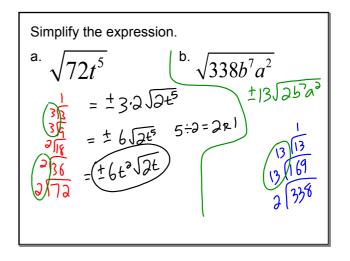
$$13\overline{)13}$$ → 1
$$13\overline{)169}$$ → 13
$$2\overline{)338}$$

Simplify the expression.

$$\sqrt{\frac{11}{4}}$$

$$\sqrt{\frac{81}{36}}$$

Simplify the expression.

$$\sqrt{\frac{32}{n^2}}$$

Simplify the expression.

a. $$\sqrt{\frac{15}{16}}$$

b. $$\sqrt{\frac{80g}{16k^9}}$$

After a car accident, a police officer measure the length x (in feet) of a car's skid marks. The expression $\sqrt{27x}$ gives the car's speed in miles per hour at the time the brakes were applied.

a) Write the expression in simplest form.

b) The skid marks were 125 feet long, use the simplified expression to approximate the car's speed when the brakes were applied.

Exit Pass 9.2

Describe and correct the error in writing $\sqrt{72}$ in simplest form.

$$\sqrt{72} = \sqrt{4*18}$$
$$= \sqrt{4} * \sqrt{18}$$
$$= 2\sqrt{18}$$

"Don't blame the sea if you cannot catch a fish."

Working individually or with a partner, complete the workbook.

Workbook pg.

Reflection of Today's Lesson

9.2 Simplifying Square Roots

7.NS
8.EE

• SWBAT simplify radical expressions.
• SWBAT understand numbers; understand ways of representing numbers.

• Calculators: No

Homework

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