

SM2 Unit 2 Extra Practice

2.1-Simplify each radical expression.

1) $\sqrt{12x^2}$
 $\begin{matrix} \wedge & & \text{xx} \\ 3 & 4 & \\ \wedge & & \\ 2 & 2 & \end{matrix}$
 $2x\sqrt{3}$

2) $\sqrt[3]{72x^5y^3}$
 $\begin{matrix} \wedge & & \text{xxx} & \text{xx} \\ 8 & 9 & & \\ \wedge & \wedge & & \\ 2 & 4 & 3 & 3 \\ \wedge & & & \\ 2 & 2 & & \end{matrix}$ $\begin{matrix} \text{yyy} \\ \wedge \\ 3 \end{matrix}$
 $2xy\sqrt[3]{9x^2}$

3) $\sqrt[3]{1000p^4qr}$
 $\begin{matrix} \wedge & & \text{pppp} \\ 10 & 100 & \\ \wedge & \wedge & \\ 2 & 5 & 2 & 5 \\ \wedge & \wedge & & \\ 2 & 5 & 2 & 5 \end{matrix}$ $\begin{matrix} \wedge \\ 3 \end{matrix}$ $\begin{matrix} \wedge \\ 2 \end{matrix}$ $\begin{matrix} \wedge \\ 2 \end{matrix}$
 $10p\sqrt[3]{pqr}$

4) $\sqrt{150a^2}$
 $\begin{matrix} \wedge & & \text{aa} \\ 15 & 10 & \\ \wedge & \wedge & \\ 3 & 5 & 2 \end{matrix}$
 $5a\sqrt{6}$

5) $\sqrt[4]{243x^7y^2z^3}$
 $\begin{matrix} \wedge & & \text{xxxx} & \text{xxx} \\ 3 & 81 & & \\ \wedge & \wedge & & \\ 9 & 9 & & \\ \wedge & \wedge & & \\ 3 & 3 & 3 & 3 \end{matrix}$ $\begin{matrix} \wedge \\ 2 \end{matrix}$ $\begin{matrix} \wedge \\ 2 \end{matrix}$ $\begin{matrix} \wedge \\ 3 \end{matrix}$
 $3x\sqrt[4]{3x^2y^2z^3}$

6) $\sqrt[5]{32x^{10}y^7}$
 $\begin{matrix} \wedge & & \text{xxxxx} & \text{xxxxx} \\ 8 & 4 & & \\ \wedge & \wedge & & \\ 2 & 4 & 2 & 2 \\ \wedge & & & \\ 2 & 2 & & \end{matrix}$ $\begin{matrix} \wedge \\ 2 \end{matrix}$ $\begin{matrix} \wedge \\ 2 \end{matrix}$ $\begin{matrix} \wedge \\ 2 \end{matrix}$ $\begin{matrix} \wedge \\ 2 \end{matrix}$
 $2x^2y\sqrt[5]{y^2}$

7) $\sqrt{27k^2}$
 $\begin{matrix} \wedge & & \text{kk} \\ 3 & 9 & \\ \wedge & & \\ 3 & 3 & \end{matrix}$
 $3k\sqrt{3}$

8) $\sqrt[3]{-625u^3v^4}$
 $\begin{matrix} \wedge & & \text{uuu} & \text{vvv} \\ 5 & 125 & & \\ \wedge & \wedge & & \\ 5 & 25 & & \\ \wedge & & & \\ 5 & 5 & & \end{matrix}$ $\begin{matrix} \wedge \\ 3 \end{matrix}$
 $-5uv\sqrt[3]{5v}$

9) $\sqrt[3]{200xy^4}$
 $\begin{matrix} \wedge & & \text{x} & \text{yyy} \\ 2 & 100 & & \\ \wedge & \wedge & & \\ 10 & 10 & & \\ \wedge & \wedge & & \\ 2 & 5 & 2 & 5 \end{matrix}$
 $2y\sqrt[3]{25xy}$

10) $\sqrt[5]{200xy^4}$
 $\begin{matrix} \wedge & & \text{x} & \text{yyy} \\ 2 & 100 & & \\ \wedge & \wedge & & \\ 10 & 10 & & \\ \wedge & \wedge & & \\ 2 & 5 & 2 & 5 \end{matrix}$ $\begin{matrix} \wedge \\ 5 \end{matrix}$ *no groups of five*
 $\sqrt[5]{200xy^4}$

2.2-Simplify each expression with multiple radicals.

11) $-2\sqrt{54} + 3\sqrt{6} + 3\sqrt{24}$

$$\begin{array}{c} \begin{array}{cc} \wedge & \wedge \\ 9 & 6 \\ \textcircled{3} & \textcircled{2} \end{array} & \begin{array}{cc} \wedge & \wedge \\ 8 & 3 \\ \textcircled{2} & \textcircled{3} \end{array} \\ \hline -6\sqrt{6} + 3\sqrt{6} + 6\sqrt{6} \\ \hline \boxed{3\sqrt{6}} \end{array}$$

12) $-3\sqrt{5} + 2\sqrt{45} - 2\sqrt{18}$

$$\begin{array}{c} \begin{array}{cc} \wedge & \wedge \\ 9 & 5 \\ \textcircled{3} & \textcircled{3} \end{array} & \begin{array}{cc} \wedge & \wedge \\ 3 & 6 \\ \textcircled{3} & \textcircled{2} \end{array} \\ \hline -3\sqrt{5} + 6\sqrt{5} - 6\sqrt{2} \\ \hline \boxed{3\sqrt{5} - 6\sqrt{2}} \end{array}$$

13) $\sqrt{12a} \cdot \sqrt{12a^2}$

$$\begin{array}{c} \sqrt{144a^3} \quad \textcircled{a} \textcircled{a} \\ \begin{array}{cc} \wedge & \wedge \\ 12 & 12 \end{array} \\ \hline 12a\sqrt{a} \end{array}$$

14) $-5\sqrt{8m} \cdot 3\sqrt{2m^2}$

$$\begin{array}{c} -15\sqrt{16m^3} \\ \begin{array}{cc} \wedge & \wedge \\ 8 & 2 \\ \textcircled{2} & \textcircled{2} \end{array} \quad \textcircled{m} \textcircled{m} \textcircled{m} \\ \hline \boxed{-60m\sqrt{m}} \end{array}$$

15) $\sqrt{15}(3 - \sqrt{6})$

$$\begin{array}{c} 3\sqrt{15} - \sqrt{90} \\ \begin{array}{cc} \wedge & \wedge \\ 9 & 10 \\ \textcircled{3} & \textcircled{2} \end{array} \\ \hline \boxed{3\sqrt{15} - 3\sqrt{10}} \end{array}$$

16) $\sqrt{6}(\sqrt{6} + 4)$

$$\begin{array}{c} \sqrt{36} + 4\sqrt{6} \\ \hline \boxed{6 + 4\sqrt{6}} \end{array}$$

Rationalize each denominator.

17) $\frac{2 \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{2\sqrt{5}}{5}$

18) $\frac{3 \cdot \sqrt{8}}{\sqrt{8} \cdot \sqrt{8}} = \frac{3\sqrt{8} \cdot \sqrt{2}}{8 \cdot \sqrt{2}} = \frac{6\sqrt{2}}{8} = \frac{3\sqrt{2}}{4}$

19) $\frac{10\sqrt{2} \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{10\sqrt{6}}{3}$

20) $\frac{7\sqrt{6} \cdot \sqrt{14}}{\sqrt{14} \cdot \sqrt{14}} = \frac{7\sqrt{84}}{14} = \frac{\sqrt{84}}{2} \begin{array}{l} \wedge \\ 6 \end{array} \begin{array}{l} \wedge \\ 3 \end{array} \begin{array}{l} \wedge \\ 2 \end{array} \begin{array}{l} \wedge \\ 7 \end{array}$

$$= \frac{2\sqrt{21}}{2} = \sqrt{21}$$

2.3-Solve each equation using radicals.

21) $x^2 = 100$

$x = \pm 10$

23) $x^3 = 64$

$x = 4$

25) $(x + 1)^2 = 9$

$x + 1 = \pm 3$

$x = \pm 3 + 1$

$x = 4 \text{ or } -2$

22) $y^2 = 64$

$y = \pm 8$

24) $x^3 = 125$

$x = 5$

26) $2y^3 + 7 = 61$

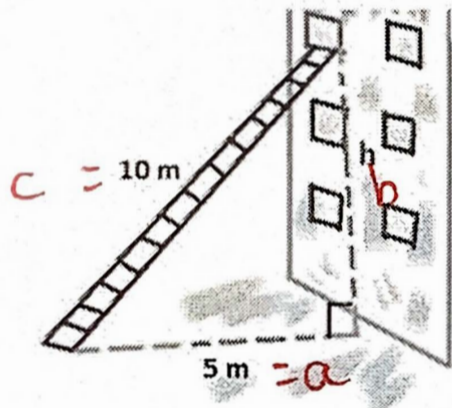
$y^3 = \frac{54}{2}$

$y^3 = 27$

$y = 3$

2.4-Sketch a diagram to represent the situation. Write an equation to represent the situation. Solve the equation.

27) How far up the wall will the ladder reach?



$a^2 + b^2 = c^2$

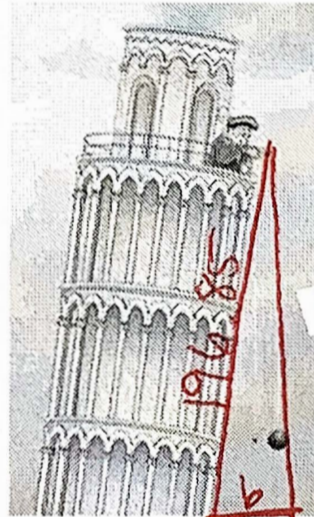
$5^2 + b^2 = 10^2$

$b^2 = 100 - 25$

$b^2 = 75$

$b = \pm \sqrt{75}$
 $b = 8.6 \text{ m}$

28) Galileo dropped a cannon ball from the top of the Leaning Tower of Pisa. The ball was dropped from a height of 191 ft. Given the Tower is 196.85 ft. How far away from the base of the tower does the cannon ball land?



$b^2 + 191^2 = 196.85^2$

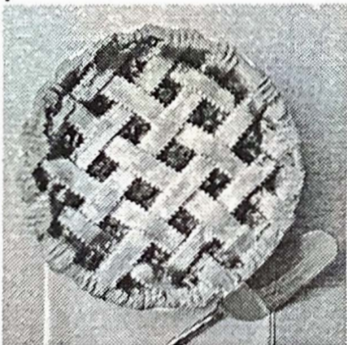
$b^2 = 196.85^2 - 191^2$

$b^2 = 2268.9225$

$b = \sqrt{2268.9225}$

$b = 47.6 \text{ ft}$

29) A cherry pie has a top surface area of 63.617 in². What is the diameter of the pie?



$A = \pi r^2$

$\frac{63.617}{\pi} = \frac{\pi r^2}{\pi}$

$20.2499 = r^2$

$\pm \sqrt{20.2499} = r$

$r = 4.49 \text{ in}$

30) A regular six sided die has a volume of 125 mm³. What is the side length of the die?



$V = s^3$

$125 = s^3$

$s = \sqrt[3]{125}$

$s = 5 \text{ mm}$