## Rationalize this denominator.

$$\frac{24m^8n^4}{\sqrt[5]{9m^6n^{17}p^{38}}} \cdot \frac{\sqrt[5]{\phantom{x}}}{\sqrt[5]{3^3\,m^4\,n^3\,p^2}} = \frac{24m^8n^4\,\sqrt[5]{3^3\,m^4n^3p^2}}{3\,m^2n^4p^8}$$

$32$

$$\sqrt[5]{3^5\,m^{10}\,n^{20}\,p^{40}}$$

$$= \frac{8\,m^6\,\sqrt[5]{3^3\,m^4n^3p^2}}{p^8}$$

## Rationalize this denominator.

$$\frac{8+\sqrt{3}}{\sqrt{6}-\sqrt{2}} \cdot \frac{\sqrt{6}+\sqrt{2}}{\sqrt{6}+\sqrt{2}} = \frac{9\sqrt{6}+11\sqrt{2}}{6-2} = \frac{9\sqrt{6}+11\sqrt{2}}{4}$$

|  | $8$ | $+\sqrt{3}$ |
|---|---|---|
| $\sqrt{6}$ | $8\sqrt{6}$ | $\sqrt{18}$ |
|  |  | $3\sqrt{2}$ |
| $+\sqrt{2}$ | $+8\sqrt{2}$ | $+\sqrt{6}$ |

## Solve this equation.

$$5 + 2\sqrt{4x-9} = 13$$
$$-5 \qquad\qquad -5$$

$$\frac{2\sqrt{4x-9}}{2} = \frac{8}{2}$$

$$\left(\sqrt{4x-9}\right)^2 = (4)^2$$

$$4x-9 = 16$$
$$+9 \qquad +9$$

$$4x = 25$$

$$\boxed{x = \frac{25}{4}}$$

## Sec 7-5: Solving Square Root and Other Radical Equations.

A radical equation is an equation that has a variable
in the radicand or a variable with a fractional exponent.

Solving Radical Equations:

1. Isolate the radical on one side of the equation.

2. Raise both sides of the equation to the same power as the index of the radical.

3. Finish solving for x.

4. Check your answers.

---

Solve this equation.

$$4 \cdot \frac{3\sqrt[4]{2x+7} - 1}{4} = 2 \cdot 4$$

$$3\sqrt[4]{2x+7} \quad -1 = 8$$
$$\phantom{3\sqrt[4]{2x+7}} \quad +1 \quad +1$$

$$\frac{3\sqrt[4]{2x+7}}{3} = \frac{9}{3}$$

$$\left(\sqrt[4]{2x+7}\right)^4 = 3^4$$

$$2x + 7 = 81$$
$$\phantom{2x} -7 \quad -7$$

$$\frac{2x}{2} = \frac{74}{2}$$

$$\boxed{x = 37}$$

---

Solve this equation.

$$\sqrt{x-4} + 4 = x - 4$$
$$\phantom{\sqrt{x-4}} -4$$

$$\left(\sqrt{x-4}\right)^2 = (x-4)^2$$

$$\boxed{x = 5, 4}$$

$$x - 4 = x^2 - 8x + 16$$
$$0 = x^2 - 9x + 20$$
$$0 = (x-4)(x-5)$$

$$\begin{array}{c} +20 \\ -4 \diagdown -5 \\ -9 \end{array}$$

---

Solve this equation.

$$\sqrt{5x+19} - 1 = x$$
$$\phantom{\sqrt{5x+19}} +1 \quad +1$$

$$\left(\sqrt{5x+19}\right)^2 = (x+1)^2$$

$$5x + 19 = x^2 + 2x + 1$$
$$0 = x^2 - 3x - 18$$
$$0 = (x-6)(x+3)$$

These equations can lead to extraneous solutions like rational equations can.
So you had better check your answers!

$$\boxed{x = 6, -\cancel{3}}$$

$$\begin{array}{c} -18 \\ -6 \diagdown +3 \\ -3 \end{array}$$

Solve this equation.

$$2(x + 4)^{\frac{1}{3}} + 8 = 14$$

$$2\sqrt[3]{x+4} + 8 = 14$$
$$\phantom{2\sqrt[3]{x+4}} -8 \quad -8$$

$$\frac{2\sqrt[3]{x+4}}{2} = \frac{6}{2}$$

$$\left(\sqrt[3]{x+4}\right)^3 = (3)^3$$

$$x+4 = 27$$
$$-4 \quad -4$$

$$\boxed{x = 23}$$

Solve this equation.

$$(2x + 1)^{\frac{2}{3}} + 11 = 36$$
$$\phantom{(2x+1)^{2/3}} -11 \qquad -11$$

$$\left[(2x+1)^{\frac{2}{3}}\right]^{\frac{3}{2}} = \left[25\right]^{\frac{3}{2}}$$

$$2x+1 = 125$$
$$-1 \qquad -1$$

$$\frac{2x}{2} = \frac{124}{2} \qquad \boxed{x = 62}$$