

## Approximating and Rewriting Radicals

Simplify each radical expression.

$$1) \sqrt{125} = \sqrt{25} \cdot \sqrt{5} \\ = 5\sqrt{5}$$

$$2) \sqrt{18} = \sqrt{9} \cdot \sqrt{2} \\ = 3\sqrt{2}$$

Simplify.

$$3) \sqrt{36x^2} = \sqrt{36} \cdot \sqrt{x^2} \\ = 6x$$

$$4) \sqrt{100x^3} = \sqrt{100} \cdot \sqrt{x^2} \sqrt{x} \\ = 10x\sqrt{x}$$

Solve each quadratic equation by taking the square root of each side.

5)  $a^2 = 64$

$$\sqrt{a^2} = \sqrt{64}$$

$$a = \pm 8 \text{ or } \{-8, 8\}$$

6)  $m^2 = 0$

$$\sqrt{m^2} = \sqrt{0}$$

$$m = 0 \text{ or } \{0\}$$

7)  $\frac{3x^2}{3} = \frac{159}{3}$

$$\sqrt{x^2} = \sqrt{53}$$

$$x^2 = 53 \quad x = \pm \sqrt{53} \text{ or}$$

$$53 \text{ is prime!} \quad \{-\sqrt{53}, \sqrt{53}\}$$

8)  $x^2 - 6 = 94$

$$\frac{+6}{+6} \quad \frac{+6}{+6}$$

$$x^2 = 100$$

$$\sqrt{x^2} = \sqrt{100}$$

$$x = \pm 10 \text{ or}$$

$$\{-10, 10\}$$

9)  $(x-4)^2 = 0$

$$\sqrt{(x-4)^2} = \sqrt{0^2}$$

$$\frac{x-4}{+4} = \frac{0}{+4}$$

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

10)  $(n+9)^2 = 55$

$$\sqrt{(n+9)^2} = \sqrt{55}$$

$$\frac{n+9}{-9} = \frac{\pm\sqrt{55}}{-9}$$

$$n = -9 \pm \sqrt{55}$$

11)  $(x-2)^2 + 4 = 79$

$$\frac{-4}{-4} \quad \frac{-4}{-4}$$

$$(x-2)^2 = 75$$

$$\sqrt{(x-2)^2} = \pm\sqrt{75}$$

$$x-2 = \pm 5\sqrt{3}$$

$$\frac{+2}{+2} \quad \frac{+2}{+2}$$

$$x = 2 \pm 5\sqrt{3}$$

$$\sqrt{75} \\ \swarrow \quad \searrow \\ \sqrt{25} \sqrt{3} \\ 5\sqrt{3}$$

12)  $(b+9)^2 + 4 = 40$

$$\frac{-4}{-4} \quad \frac{-4}{-4}$$

$$(b+9)^2 = 36$$

$$\sqrt{(b+9)^2} = \pm\sqrt{36}$$

$$\frac{b+9}{-9} = \frac{\pm 6}{-9}$$

$$b = -9 \pm 6$$

$$b = -9 + 6 = -3, \quad b = -9 - 6 = -15$$

$$\{-15, -3\}$$