

Key Concepts: Simplifying square roots**Quadratic Equations/ The square root property****Quadratic Equations/ The quadratic formula****Square roots**

- If b is a positive real number, the principal square root of b is the positive number, a , with the property that $a^2 = b$.
- Positive real numbers in fact have two square roots, one positive (\sqrt{b}) and one negative ($-\sqrt{b}$).
- $\sqrt{0} = 0$
- The square roots of a negative real number are not real numbers.

Find each square root.

$\sqrt{36}$

$-\sqrt{100}$

$\sqrt{\frac{4}{9}}$

$-\sqrt{-25}$

The product rule for square rootsIf $a \geq 0$ and $b \geq 0$, then $\sqrt{ab} = \sqrt{a}\sqrt{b}$.

Simplify each expression.

$\sqrt{50}$

$-\sqrt{32}$

$$\sqrt{12}\sqrt{3}$$

$$\sqrt{180}$$

$$\frac{4 \pm \sqrt{12}}{2}$$

$$\frac{16 \pm \sqrt{27}}{4}$$

The square root property

If $a \geq 0$ and $u^2 = a$, then $u = \sqrt{a}$ or $u = -\sqrt{a}$

Use the square root property to find all solutions to each equation.

$$x^2 = 9$$

$$t^2 = 44$$

$$(2x - 1)^2 = 9$$

$$(3x + 6)^2 = 18$$

$$(5t - 7)^2 = 72$$

$$(7w + 1)^2 = -81$$

The quadratic formula

If $a \neq 0$, then the solutions to the equation $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Use the quadratic formula to solve each equation.

$$11x^2 - 10x + 2 = 0$$

$$2z^2 = z + 3$$

$$10 - x^2 = 2x$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$5t^2 - 2t + 1 = 0$$

$$\frac{y^2}{2} = 3y - 1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$5u - 4u^2 = \frac{3}{2}$$

$$4x^2 + 4x = -1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$36x^2 = 15$$