

Algebra 1

Our Goal: To learn to solve quadratic equations using square roots

Warm Up: Square root review

Today's Homework

- 9.3 Exercises, p.501: 4-30 (evens)

Previous Homework

9.1 Textbook Exercises, p.485-486:

14-28 (evens), 40-60 (multiples of 4), and 75, 80

(that's 14,16,18,20,22,24,26,28,40,44,48,52,56,60,75,80)

Simplify $\sqrt{18}$

$$3 \cdot \sqrt{2}$$

$$3\sqrt{2}$$

Simplify $\sqrt{\frac{2}{3}}$

$$\frac{\sqrt{6}}{3}$$

Simplify $\frac{7}{2-\sqrt{3}}$

Simplify $\sqrt{75} - \sqrt{3}$

$$\sqrt{25} \sqrt{3} - \sqrt{3}$$

$$5\sqrt{3} - \sqrt{3}$$

$$\cancel{5} \quad 4\sqrt{3}$$

Simplify $\sqrt{8} + \sqrt{10} - \sqrt{20}$

$$\sqrt{4 \cdot 2} \quad \sqrt{4 \cdot 5}$$

$$2\sqrt{2} + \sqrt{10} - 2\sqrt{5} \leftarrow$$

$$2\sqrt{2} + \sqrt{2}\sqrt{5} - 2\sqrt{5}$$

$$\sqrt{2}(2 + \sqrt{5}) - 2\sqrt{5}$$

$$2\sqrt{2} + \sqrt{5} - 2\sqrt{5}$$

$$2\sqrt{2} - \sqrt{5}$$

Core Concept

Solutions of $x^2 = d$

- When $d > 0$, $x^2 = d$ has two real solutions, $x = \pm\sqrt{d}$.
- When $d = 0$, $x^2 = d$ has one real solution, $x = 0$.
- When $d < 0$, $x^2 = d$ has no real solutions.

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

$$\sqrt{(-5)^2} = |-5| = 5$$

a. Solve $3x^2 - 27 = 0$ using square roots.

$$3x^2 = 27$$

$$x^2 = 9$$

$$|x| = 3$$

$$x = 3 \text{ or } -3$$

$$\pm 3$$

b. Solve $x^2 - 10 = -10$ using square roots.

$$x^2 = 0$$

$$|x| = 0$$

$$x = 0$$

c. Solve $-5x^2 + 11 = 16$ using square roots.

$$-5x^2 = 5$$

$$x^2 = -1$$

$$|x| = \sqrt{-1}$$

no solution

not a real number

Solve $(x - 1)^2 = 25$ using square roots.

Solve $(x + 3)^2 - 7 = 21$ using square roots.

$$\sqrt{(x+3)^2} = \sqrt{28}$$

$$\therefore |x+3| = \sqrt{28}$$

$$x+3 = \sqrt{28} \text{ or } x+3 = -\sqrt{28}$$

$$x = -3 + \sqrt{28} \text{ or } x = -3 - \sqrt{28}$$

$$-3 + 2\sqrt{7} \text{ or } -3 - 2\sqrt{7}$$

$$-3 \pm 2\sqrt{7}$$

$$7(x-1)^2 - 7 = 3$$

$$7(x-1)^2 = 10$$

$$\sqrt{(x-1)^2} = \sqrt{\frac{10}{7}}$$

$$x-1 = \pm \sqrt{\frac{10}{7}}$$

$$x = 1 \pm \sqrt{\frac{10}{7}}$$

$$x = 1 \pm \frac{\sqrt{10} \sqrt{7}}{\sqrt{7} \sqrt{7}}$$

$$x = 1 \pm \frac{\sqrt{70}}{7}$$

$$= \frac{7}{7} \pm \frac{\sqrt{70}}{7}$$

$$= \frac{7 \pm \sqrt{70}}{7}$$

$$3(x+7)^2 - 42 = -30$$

$$3(x+7)^2 = 12$$

$$(x+7)^2 = 4$$

$$x+7 = \pm\sqrt{4}$$

$$x = -7 \pm \sqrt{4}$$

$$\rightarrow x = -7 \pm 2$$

$$x = -5, -9$$

Solve $2(x + 1)^2 = 14$ using square roots.

Solve $5(x - 6)^2 + 1 = 41$ using square roots.

Graph $y = x^2 - 2x - 3$

Solve $x^2 - 2x - 3 = 0$
 $x = 3$ or -1

Graph $y = x^2 + 2x + 1$

Solve $x^2 + 2x + 1 = 0$
 $x = -1$

Graph $y = x^2 - 4x + 7$

Solve $x^2 - 4x + 7 = 0$

no solution

Solve $4x^2 - 13 = 15$ using square roots.
Round the solutions to the nearest hundredth.

Solve the equation using square roots. Round your solutions to the nearest hundredth.

7. $x^2 + 8 = 19$

8. $5x^2 - 2 = 0$

9. $3x^2 - 30 = 4$

A touch tank has a height of 3 feet. Its length is three times its width. The volume of the tank is 270 cubic feet. Find the length and width of the tank.



The area A of an equilateral triangle with side length s is given by the formula $A = \frac{\sqrt{3}}{4}s^2$. Solve the formula for s . Then approximate the side length of the traffic sign that has an area of 390 square inches.



Exit Ticket: State the number of solutions for each equation.

a. $2x^2 + 8 = 40$

b. $2x^2 - 8 = -40$

c. $2x^2 = 0$