

Complete each problem.

1. The quadratic formula is  $x = \frac{-b \pm \sqrt{b^2 + 4ac}}{2a}$ .

- true  
 false

2. For the equation  $2x^2 + x = 15$ ,  $a = 2$ ,  $b = 1$ , and  $c = -15$ .

- true  
 false

3. What is the discriminant and why is it useful? Explain your reasoning.

**Sample answer:**

**The discriminant is the expression under the radical of the quadratic formula,  $b^2 - 4ac$ . It is used to describe the nature of the solutions for a quadratic equation.**

4. When solving a quadratic equation, Kaleem set up the quadratic formula as

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(3)(1)}}{2(3)}$$

Which quadratic equation is he solving?

- $3x^2 - 5x + 1 = 0$       $3x^2 + 5x + 1 = 0$   
  $3x^2 - 5x = 1$       $3x^2 + 5x = 1$

5. How many real solutions does  $2x^2 - 3x + 5 = 0$  have?

- 2  
 1  
 0

Solve each quadratic equation using the quadratic formula.

6.  $x^2 + 7x + 3 = 0$

$$x = \frac{-7 \pm \sqrt{37}}{2}$$

7.  $-3x^2 - 12x - 2 = 0$

$$x = \frac{-6 \pm \sqrt{30}}{3}$$

8. Identify the coefficients of the quadratic equation.

$$3x^2 + 14x = 5$$

$$a = 3 \quad b = 14 \quad c = -5$$

Solve the equation using the quadratic formula.

$$x = \frac{1}{3} \quad \text{or} \quad x = -5$$

Solve each quadratic equation using the quadratic formula.

9.  $x^2 + 30 = -16x$

$x = -8 \pm \sqrt{34}$

10.  $9x^2 + 6x = -15$

**no real solution**

Find each discriminant and describe the nature of the solutions

11.  $8x^2 - 2x - 1 = 0$

Discriminant: **36**

Nature of the solutions

- one real rational solution
- two real rational solutions
- two real irrational solutions
- no real solution**

12.  $25x^2 - 30x + 9 = 0$

Discriminant: **0**

Nature of the solutions:

- one real rational solution**
- two real rational solutions
- two real irrational solutions
- no real solution

13. The quadratic equation  $h = -4.9t^2 + 23t + 1$  represents the height,  $h$  (in meters), of an object kicked after  $t$  seconds.

At what times is the height of the object at 15 meters? Express your answers as decimals rounded to the nearest hundredth.

**The object is at 15 feet at 0.72 seconds and at 3.98 seconds.**

Will the object reach 25 meters? Explain your answer.

**Sample answer:**

**I can substitute  $h = 25$  into the equation and find the discriminant. Since the discriminant is 58.6, I know that there are two times the object will reach 25 meters.**

How long does it take the object to hit the ground? Express your answer as a decimal rounded to the nearest hundredth.

*Hint:* What is the height of the ball when it hits the ground?

**The object will hit the ground after approximately 4.74 seconds.**