2-6 Additional Practice

The Quadratic Formula

Use the Quadratic Formula to solve the equation. Show your work.

1. $x^2 - 15x + 7 = 0$

$$x = \frac{15 \pm \sqrt{(-15)^2 - 4(1)(7)}}{2 \times 1}$$

$$= \frac{15 \pm \sqrt{197}}{2}$$

$$x = \frac{15 + \sqrt{197}}{2} \text{ or } x = \frac{15 - \sqrt{197}}{2}$$

2. $3x^2 + 2x + 1 = 0$

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

$$= \frac{-2 \pm \sqrt{-8}}{2 \times 3}$$

$$x = \frac{-1 + i\sqrt{2}}{3} \text{ or } x = \frac{-1 - i\sqrt{2}}{3}$$

Use two different methods to solve the equations. Show your work.

3. $x^2 + 4x - 5 = 0$

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

$$= \frac{-4 \pm \sqrt{36}}{2}$$

$$x = 1 \text{ or } x = -5$$

Method 2: $x^2 - x + 5x - 5 = 0$

$$x(x - 1) + 5(x - 1) = 0$$

$$(x + 5)(x - 1) = 0$$

$$x = 1 \text{ or } x = -5$$

Use the discriminant to describe the solutions as one real, two real, or two imaginary solutions.

4. $x^2 - 15x + 12 = 0$

$(-15)^2 - 4(1)(12)$
$= 177 > 0$
Two real solutions.

5. $3x^2 - 6x + 4 = 0$

$(-6)^2 - 4(3)(4)$
$= -12 < 0$
Two imaginary solutions.

6. Find the value(s) of k that will cause the equation $4x^2 + kx + 4$ to have zero real solutions, one real solution, or two real solutions.

Zero real solutions: $k^2 - 4(4)(4) < 0$ $k^2 - 64 < 0$ so $-8 < k < 8$
One real solution: $k^2 - 4(4)(4) = 0$ $k^2 - 64 = 0$ so $k = \pm 8$
Two real solutions: $k^2 - 4(4)(4) > 0$ $k^2 - 64 > 0$ so $k < -8$ or $k > 8$

7. Margaret runs a business. This year's revenue is given by the function $R = -0.5x^2 - 200x$. Can her revenue be at least $25,000 this year?

$25{,}000 = -0.5x^2 - 200x$
$-0.5x^2 - 200x - 25{,}000 = 0$
$(-200)^2 - 4(-0.5)(-25{,}000) = 40{,}000 - 50{,}000 = -10{,}000 < 0$
No, she cannot generate $25,000.