7A. QUADRATIC Equations p. 27-28

7. Algebra 1: Quadratic Equations

Study Guide MRS. WILSON

1. Simplify $\sqrt{64}$

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2. Simplify $\sqrt{\frac{4}{49}}$

$\frac{2}{7}$

3. Solve:

$3x^2 - 27 = 0$

$+27 \quad +27$

$\frac{3x^2}{3} = \frac{27}{3}$

$\sqrt{x^2} = \sqrt{9}$

$x = \pm 3$

4. Solve:

$4x^2 + 10 = 110$

$-10 \quad -10$

$\frac{4x^2}{4} = \frac{100}{4}$

$\sqrt{x^2} = \sqrt{25}$

$x = \pm 5$

5. Solve for x.

$\sqrt{(x-2)^2} = \sqrt{25}$

$x - 2 = \pm 5$

$x - 2 = 5 \quad x - 2 = -5$

$+2 \quad +2 \quad +2 \quad +2$

$x = 7 \quad x = -3$

6. Solve for x.

$(x+3)^2 + 9 = 58$

$-9 \quad -9$

$\sqrt{(x+3)^2} = \sqrt{49}$

$x + 3 = \pm 7$

$x + 3 = 7 \quad x + 3 = -7$

$-3 \quad -3 \quad -3 \quad -3$

$x = 4 \quad x = -10$

7. Solve for x.

$x^2 + 7x + 12 = 0$

$3 \cdot 4 = 12, \quad 3 + 4 = 7$

$x + 3 = 0 \quad x + 4 = 0$

$-3 \quad -3 \quad -4 \quad -4$

$x = -3 \quad x = -4$

8. Solve for x.

$x^2 + 6x - 7 = 0$

$-7 \cdot 1 = -7, \quad -7 + 1 = 6$

$x + 7 = 0 \quad x - 1 = 0$

$-7 \quad -7 \quad +1 \quad +1$

$x = -7 \quad x = 1$

9. Solve for x.

$3x^2 - 8x + 5 = 0$

$-1 \cdot -5 = 5, \quad -3 - 5 = -8$

$3x - 5 = 0 \quad x - 1 = 0$

$+5 \quad +5 \quad +1 \quad +1$

$\frac{3x}{3} = \frac{5}{3} \quad x = 1$

10. Solve for x.

$4x^2 - 64 = 0$

$+64 \quad +64$

$\frac{4x^2}{4} = \frac{64}{4}$

$\sqrt{x^2} = \sqrt{16}$

$x = \pm 4$

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11. Describe the number of solutions:

$$x^2 - 6x + 6 = 0$$

$b^2 - 4ac$

$(-6)^2 - 4(1)(6)$

$36 - 24 = 12$

positive:

2 solutions

12. Describe the number of solutions:

$$x^2 + 6x + 9 = 0$$

$6^2 - 4(1)(9)$

$36 - 36$

0

zero:

1 Solution

13. Solve by completing the square. Fill in Step 2 and Step 3.

$$x^2 - 12x - 13 = 0$$

$\left(\frac{-12}{2}\right)^2 = (-6)^2 = 36$

Step 1	$x^2 - 12x + \underline{36} = +13 + \underline{36}$
Step 2	$(\underline{x-6})^2 = \underline{49}$
Step 3	$\underline{x-6} = \pm \underline{7}$
Step 4	$x = -1$ and $x = 13$

14. Solve by using the quadratic formula. Fill in Step 2.

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

Step 1	$x = \frac{-(5) \pm \sqrt{(5)^2 - 4(1)(-8)}}{2(1)}$
Step 2	$x = \frac{-5 \pm \sqrt{(25) + (32)}}{2}$
Step 3	$x = \frac{-5 \pm \sqrt{57}}{2}$

Free Response

15. A model rocket is fired vertically into the air at $36\ m/s$. The expression $-9t^2 + 36t$ gives the rocket's height after t seconds. Find the number of seconds it takes for the rocket to reach the ground. $h = 0$

$h = -9T^2 + 36T$

$0 = -9T^2 + 36T$

$0 = -9T(T-4)$

$\frac{0}{-9} = \frac{-9T}{-9}$

$0 = T$

$T - 4 = 0$

$+4 \quad +4$

$T = 4$ seconds to reach the ground

16. A landscaper is designing a rectangular brick patio. She has enough bricks to cover 60 square feet. She wants the length of the patio to be 4 feet longer than the width. What dimensions should she use for the patio?

60 (w) / (w+4)

$A = LW$

$60 = (w+4)(w)$

$60 = w^2 + 4w$

$-60 \quad -60$

$0 = w^2 + 4w - 60$

-60, 10, -6, w, 4, w

$w + 10 = 0$

$-10 \quad -10$

$w = -10$

$L = 10$

$w - 6 = 0$

$+6 \quad +6$

$w = 6$

$w = 6$

17. An artist is working on a rectangular painting with a length that is 8 inches longer than its width. The area of the painting is 48 square inches. What is the length and width of the painting?

48 (w) / (w+8)

$48 = w(w+8)$

$48 = w^2 + 8w$

$-48 \quad -48$

$0 = w^2 + 8w - 48$

-48, 12, -4, w, 8, w

$w - 4 = 0$

$+4 \quad +4$

$w = 4$

$L = w + 8 = 4 + 8 = 12$

$L = w + 8$

-48

$0 = w^2 + 8w - 48$

$L = w + 8 = 4 + 8 = 12$