Unit 10 Problem Set Packet - Solving Quadratic Equations

Name: _____ Class: _____

PS #10.1 – Solving Quadratic Equations by Factoring

For 1 – 14, if it is an equation, solve it by factoring. If it is an expression, factor it.

1.) $x^2 - 11x + 24 = 0$

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

3.) $3m^2 + 5m + 2 = 2m^2 + 4m + 8$

4.) $7x^2 = -2x$

5.) $x^2 - 36$

6.) $4y^2 - 9 = 0$

7.) $(x - 4)(x + 2) = 0$

8.) $10x^3 = 5x^2 + 105x$

9.) $4x^2 - 10x = 0$

10.) $6r^2 - 12r = -6$

11.) $2x = 7x + 60$

12.) $(x + 6)(x - 4) = -9$

13.) $-2x^2 - 5x - 2 = 0$

14.) $x^2 = 9x$

15.) How many unique solutions does $x^2 - 2x + 1 = 0$ have?

16.) Find a quadratic equation that has a solution set of $\{2, -9\}$.

17.) Simplify each of the following radicals below.

a.) $\sqrt{8}$

b.) $\sqrt{50}$

c.) $2\sqrt{112}$

PS #10.2 – Solving Quadratic Equations by Square Rooting

For 18 – 23, solve each equation by square rooting. Leave each answer in simplest radical form.

18.) $4a^2 = 16$

19.) $8 - c^2 = 5$

20.) $(x - 2)^2 = 9$

21.) $6 = 24(x + 1)^2$

22.) $2(x + 7)^2 = 96$

23.) $16(x - 4)^2 = 3$

For 24 – 26, solve each proportion. You can solve by either factoring or square rooting.

24.) $\dfrac{r}{4} = \dfrac{9}{r}$

25.) $\dfrac{2x}{x+3} = \dfrac{3x+6}{4x+7}$

26.) $\dfrac{2x-7}{x-5} = x-1$

27.) Find a quadratic equation that has a solution set of $\{-4, -10\}$.

28.) Solve the following quadratic equation by square rooting and by factoring.

$$4(x-3)^2 = 1$$

Square Rooting   **Factoring**

* PS #10.3 – Completing the Square Day 1*

For 29 – 32, find the value of c that will complete the square.

29.) $x^2 + 6x + c$

30.) $x^2 - 34x + c$

31.) $x^2 - 7x + c$

32.) $x^2 - \dfrac{25}{13}x + c$

For 33 – 42, rewrite each expression by completing the square:

33.) $a^2 + 4a + 15$

34.) $n^2 - 2n - 15$

35.) $c^2 + 20c - 40$

36.) $k^2 + 7k + 6$

37.) $x^2 + 11x - 5$

38.) $x^2 - 0.2x + 1.5$

39.) $f^2 - \dfrac{3}{4}f + \dfrac{3}{4}$

40.) $x^2 - 5x + 6.5$

41.) $x^2 - 0.3x + 0.1$

42.) $x^2 - bx + c$

* PS #10.4 – Completing the Square Day 2*

For 43 – 52, rewrite each expression by completing the square:

43.) $3x^2 + 12x - 8$

44.) $-7x^2 - 70x + 8$

45.) $4p^2 - 12p + 13$

46.) $5x^2 + 45x + 103.5$

47.) $\frac{1}{2}y^2 + 3y - 4$

48.) $-2x^2 + 8x + 5$

49.) $1.2n^2 - 3n + 6.5$

50.) $\frac{1}{3}v^2 - 4v + 10$

51.) $8n^2 + 2n + 5$

52.) $\frac{4}{3}b^2 + 6b - 5$

PS #10.5 – Solving Quadratic Equations by Completing the Square

For 53 – 56, solve each equation by completing the square. If necessary, leave the answer in simplest radical form.

53.) $x^2 - 10x = 23$

54.) $\frac{1}{2}r^2 - 6r = 2$

55.) $-4x^2 = 24x + 11$

56.) $v^2 - 6v = -91$

For 57 – 60, solve each equation by completing the square. If necessary, round to the nearest hundredths.

57.) $2y^2 + 3y - 5 = 4$

58.) $p^2 - 3p = 8$

59.) $2q^2 = 3 - 16q$

60.) $\frac{1}{3}m^2 + 2m + 8 = -50$

61.) Solve the following quadratic equation by completing the square and by factoring.

$$\frac{1}{4}x^2 - x = 3$$

Completing the Square	**Factoring**

PS #10.6 – Solving Quadratic Equations Using the Quadratic Formula

62.) What is the quadratic formula?

For 63 – 66, solve each equation using the quadratic formula. If necessary, leave the answer in simplest radical form.

63.) $x^2 - 3x - 8 = 0$

64.) $2x^2 - 19 = -6x$

65.) $8a^2 + 6a = -5$

66.) $10x^2 + 2x - 16 = x^2 + 8x - 5$

For 67 – 68, solve each equation using the quadratic formula. If necessary, round to the nearest hundredth.

67.) $2q^2 - 8 = 3q$

68.) $7a^2 - 7a + 4 = 3a^2 - 6a + 12$

69.) Solve each quadratic equation using all three methods: factoring, completing the square, and the quadratic formula.

$$x^2 - 7x - 18 = -2x^2 + 6x - 8$$

First get in $ax^2 + bx + c = 0$ form!	Solve by Factoring

Solve by Completing the Square	Solve by Using the Quadratic Formula

PS #10.7 – Applications of Quadratic Equations

70.) A physics teacher put a ball at the top of a ramp and let it roll down toward the floor. The class determined that the height of the ball could be represented by the equation $h = -16t^2 + 4$, where the height is measured in feet from the ground and time t in seconds.

a.)   In the equation, explain what the 4 represents.

b.)   Use the equation to determine the time it takes the ball to reach the floor.

71.) The ratio of the length to width (measured in inches) in a rectangle is 4:7. Find the length of the rectangle if the area is known to be 700 sq. in.

72.) The house numbers of Michael and his two neighbors are consecutive odd integers. The product of the first and the second house numbers is equal to 8 more than the third. Find each house number.

73.) Emily is painting an accent wall in her room where the length of the wall is 3 ft more than its width. The wall has an area of 130 ft^2. What are the length and the width, in feet?

74.) The side of a square is three feet longer than the side of another square. If the sum of the areas of the squares is 117 square feet, find the length of a side of the smaller square.

75.) Find three consecutive positive integers such that the product of the first and the second is 34 less than the third squared.

76.) The three Brady sisters have ages that are consecutive even integers. The product of the first and third sisters' ages is 20 more than twice the second girls' age. Find the age of the oldest sister.

77.) Nick is a painter and he wonders if he would have time to catch a paint bucket dropped from his ladder before it hits the ground. He drops a bucket from the top of his 9-foot ladder. The height, h, of the bucket during its fall can be represented by the equation, $h = -16t^2 + 9$, where the height is measured in feet from the ground, and the time since the bucket was dropped is measured in seconds. After how many seconds does the bucket hit the ground? Do you think he could catch the bucket before it hits?

78.) If the ratio of the length to the width of a rectangle is $2:3$ and the area of the rectangle is 384 square inches, find the perimeter of the rectangle in inches.