Name _____ Date _____ Class_____

Review for Mastery

The Quadratic Formula and the Discriminant

The Quadratic Formula can be used to solve any quadratic equation.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Solve $2x^2 - 5x - 12 = 0$ using the quadratic formula.

$$2x^2 - 5x - 12 = 0$$

Step 1: Identify a, b, and c.

$a = 2$

$b = -5$

$c = -12$

Step 2: Substitute into the quadratic formula.

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-12)}}{2(2)}$$

Step 3: Simplify.

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(-12)}}{2(2)}$$

$$x = \frac{5 \pm \sqrt{25 - (-96)}}{4}$$

$$x = \frac{5 \pm \sqrt{121}}{4}$$

$$x = \frac{5 \pm 11}{4}$$

Step 4: Write two equations and solve.

$$x = \frac{5 + 11}{4} \quad \text{or} \quad x = \frac{5 - 11}{4}$$

$$x = 4 \quad \text{or} \quad x = -\frac{3}{2}$$

Solve using the quadratic equation by filling in the blanks below.

1. $x^2 + 2x - 35 = 0$

   $a = $ ___; $b = $ ___; $c = $ ___

   $$x = \frac{-(\boxed{}) \pm \sqrt{(\boxed{})^2 - 4(\boxed{})(\boxed{})}}{2\boxed{}}$$

   Simplify:

   _____

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

   $a = $ ___; $b = $ ___; $c = $ ___

   $$x = \frac{-(\boxed{}) \pm \sqrt{(\boxed{})^2 - 4(\boxed{})(\boxed{})}}{2\boxed{}}$$

   Simplify:

   _____

3. $x^2 + x - 20 = 0$

   $a = $ ___; $b = $ ___; $c = $ ___

   $$x = \frac{-(\boxed{}) \pm \sqrt{(\boxed{})^2 - 4(\boxed{})(\boxed{})}}{2\boxed{}}$$

   Simplify:

   _____

4. $2x^2 - 9x - 5 = 0$

   $a = $ ___; $b = $ ___; $c = $ ___

   $$x = \frac{-(\boxed{}) \pm \sqrt{(\boxed{})^2 - 4(\boxed{})(\boxed{})}}{2\boxed{}}$$

   Simplify:

   _____

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LESSON	**Review for Mastery**
9-9	*The Quadratic Formula and the Discriminant* continued

The discriminant of a quadratic equation is $b^2 - 4ac$. The discriminant will indicate the number of real solutions in a quadratic equation.

If $b^2 - 4ac > 0$	the equation has 2 real solutions.
If $b^2 - 4ac = 0$	the equation has 1 real solution.
If $b^2 - 4ac < 0$	the equation has 0 real solutions.

Find the number of real solutions of $4x^2 - 8x + 5 = 0$ using the discriminant.

$4x^2 - 8x + 5 = 0$

Step 1: Identify a, b, and c.

$a = 4$, $b = -8$, $c = 5$

Step 2: Substitute into $b^2 - 4ac$.

$(-8)^2 - 4(4)(5)$

Step 3: Simplify.

$64 - 80 = -16$

$b^2 - 4ac$ is negative.
There are no real solutions.

Find the number of real solutions of $9x^2 - 49 = 0$ using the discriminant.

$9x^2 - 49 = 0$

Step 1: Identify a, b, and c.

$a = 4$, $b = 0$, $c = -49$

Step 2: Substitute into $b^2 - 4ac$.

$(0)^2 - 4(9)(-49)$

Step 3: Simplify.

$0 + 1764 = 1764$

$b^2 - 4ac$ is positive.
There are two real solutions.

Find the number of real solutions of each equation using the discriminant by filling in the boxes below.

5. $4x^2 + 20x + 25 = 0$

$a = \boxed{}$; $b = \boxed{}$; $c = \boxed{}$

$(\boxed{})^2 - 4(\boxed{})(\boxed{})$

6. $15x^2 + 8x + -1 = 0$

$a = \boxed{}$; $b = \boxed{}$; $c = \boxed{}$

$(\boxed{})^2 - 4(\boxed{})(\boxed{})$

_____

_____

Find the number of real solutions of each equation using the discriminant.

7. $x^2 + 9x - 36 = 0$

8. $25x^2 + 4 = 0$

_____

_____

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LESSON 9-9 **Practice A**

The Quadratic Formula and the Discriminant

Solve using the quadratic formula.

1. $x^2 + 6x + 5 = 0$

   a: ☐ b: ☐ c: ☐

   $x = \dfrac{-\boxed{} \pm \sqrt{\boxed{}^2 - 4\boxed{}\,\boxed{}}}{2\boxed{}}$

   _____

2. $x^2 - 9x + 20 = 0$

   a: ☐ b: ☐ c: ☐

   $x = \dfrac{-\boxed{} \pm \sqrt{\boxed{}^2 - 4\boxed{}\,\boxed{}}}{2\boxed{}}$

   _____

3. $2x^2 + 9x + 4 = 0$

   a: ☐ b: ☐ c: ☐

   _____

4. $x^2 - 3x - 18 = 0$

   a: ☐ b: ☐ c: ☐

   _____

Find the number of real solutions of each equation using the discriminant.

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

   $b^2 - 4ac = \boxed{}^2 - 4\boxed{}\,\boxed{}$

   $= $ _____

   _____

6. $x^2 + 10x + 25 = 0$

   $b^2 - 4ac = \boxed{}^2 - 4\boxed{}\,\boxed{}$

   $= $ _____

   _____

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

   $b^2 - 4ac = $ _____

   _____

Solve using any method.

8. $x^2 - 64 = 0$

9. $x^2 + 12x + 36 = 0$

_____   _____

10. $x^2 + 4x - 32 = 0$

11. $2x^2 + 9x - 5 = 0$

_____   _____

LESSON	**Practice B**
9-9	*The Quadratic Formula and the Discriminant*

Solve using the quadratic formula.

1. $x^2 + x = 12$

2. $4x^2 - 17x - 15 = 0$

_____

3. $2x^2 - 5x = 3$

4. $3x^2 + 14x - 5 = 0$

_____

Find the number of real solutions of each equation using the discriminant.

5. $x^2 + 25 = 0$

6. $x^2 - 11x + 28 = 0$

7. $x^2 + 8x + 16 = 0$

_____

Solve using any method.

8. $x^2 + 8x + 15 = 0$

9. $x^2 - 49 = 0$

_____

10. $6x^2 + x - 1 = 0$

11. $x^2 + 8x - 20 = 0$

_____

12. In the past, professional baseball was played at the Astrodome in Houston, Texas. The Astrodome has a maximum height of 63.4 m. The height of a baseball t seconds after it is hit straight up in the air with a velocity of 45 ft/s is given by $h = -9.8t^2 + 45t + 1$. Will a baseball hit straight up with this velocity hit the roof of the Astrodome? Use the discriminant to explain your answer.

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