Reteaching 7-6

OBJECTIVE: Using the quadratic formula to solve quadratic equations   **MATERIALS:** Calculator

- The quadratic formula can be used to solve any quadratic equation.

- When the quadratic equation is in standard form ($ax^2 + bx + c = 0$) where $a \neq 0$, the solutions are found by the formula
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

Example

Solve $x^2 + 5x = 14$.

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

$$x^2 + 5x - 14 = 0 \qquad \longleftarrow \text{ Rewrite in standard form.}$$

$$\begin{array}{ccc} a & b & c \\ x^2 + 5x & - & 14 = 0 \end{array} \qquad \longleftarrow \text{ Write } a, b, c \text{ above the appropriate numbers.} \\ (a = 1, b = 5, c = -14)$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad \longleftarrow \text{ Use the quadratic formula.}$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(1)(-14)}}{2(1)} \qquad \longleftarrow \text{ Substitute 1 for } a, 5 \text{ for } b, \text{ and } -14 \text{ for } c.$$

$$x = \frac{-5 \pm \sqrt{25 - 56}}{2} \qquad \longleftarrow \text{ Solve.}$$

$$x = \frac{-5 \pm \sqrt{81}}{2}$$

$$x = \frac{-5 \pm 9}{2}$$

$$x = \frac{-5 + 9}{2} \text{ or } x = \frac{-5 - 9}{2} \qquad \longleftarrow \text{ Write two solutions.}$$

$$x = 2 \qquad x = -7$$

The solutions are 2 or -7.

Activity

Solve using the quadratic formula. Round solutions to the nearest hundredth when necessary.

1. $3x^2 + 7x + 2 = 0$

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

3. $4y^2 = 3 - 5y$

4. $2 = 11z - 5z^2$

Reteaching 7-7

OBJECTIVE: Using the discriminant to find the
number of solutions of a quadratic equation

MATERIALS: Calculator

In the quadratic formula $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$, the discriminant is the
expression under the radical sign, $b^2 - 4ac$. The discriminant determines
how many solutions, or x-intercepts, a quadratic equation has.

- If the discriminant is positive, there are two solutions.

- If the discriminant is 0, there is one solution.

- If the discriminant is negative, there are no solutions.

Example

Find the value of the discriminant and the number of solutions for each
quadratic equation.

$ax^2 + bx + c = 0$	Discriminant $(b^2 - 4ac)$	Number of Solutions	Number of x-intercepts
a. $x^2 + 2x + 3 = 0$	$(2)^2 - 4(1)(3) = -8$	none	none
b. $x^2 - 2x + 1 = 0$	$(-2)^2 - 4(1)(1) = 0$	one	one
c. $x^2 - 2x - 2 = 0$	$(-2)^2 - 4(1)(-2) = 12$	two	two

Activity

Find the value of the discriminant and the number of solutions for each
quadratic equation.

$ax^2 + bx + c = 0$	Discriminant $(b^2 - 4ac)$	Number of Solutions	Number of x-intercepts
1. $2x^2 + 3x + 3 = 0$	$(3)^2 - 4(2)(3) =$		
2. $x^2 - 2x + 4 = 0$		‘	
3. $3x^2 - 6x + 3 = 0$			

Additional Exercises

Find the value of the discriminant and the number of
solutions of each equation.

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

5. $-\frac{1}{2}x^2 + x + 3 = 0$

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