5.2N Solving Quadratic Equations – Choosing the Best Method: Part I

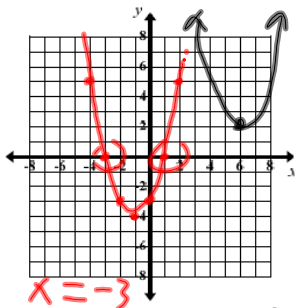
Section 5.2N

Throughout unit 5, you have explored and worked with several methods for solving a quadratic equation. Being able to identify which of those methods to use when working with a situation that is modeled by a quadratic equation is an important part of developing your mathematical knowledge of quadratic functions. The next few examples will compare the various methods.

1) Solve the following equation using each method designated. Identify the solution to the equation, and then answer the question in the end of the problem.

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

Graph:



$x = -3$
$x = 1$
Ryan P

Complete the Square:

-13

Factor: $(x+3)(x-1)$ Tammi
$=0$
$x+3=0$ $x-1=0$
$x=-3$
$x=1$

Quadratic Formula: grace

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

$\frac{-2 \pm \sqrt{16}}{2}$ $\frac{2 \pm 4}{2}$ $\frac{1 \pm 2}{1}$

$x=1$ $x=-3$

Solution(s):

$x=-3$
$x=1$

Which method was the most efficient for this problem and why?

graphing - 2 Real

Question: What are some tips/tricks that you/ your partner may have about how to choose the most efficient method to solve for a quadratic equation?

① in standard form:
$ax^2+bx+c=0$
disc = 0 OR perfect sq. #
the equation is factorable or graph

② in standard form:
disc:
positive - 2 Real Rational/Irrational
Negative - 2 Complex (use Quad Form.)
Zero - 1 Real Rational

③ $y = a(x-h)^2+k$
Solve by sq. roots

2) Solve the following equation choosing two different methods to use. Identify the solution to the equation, and then answer the question at the end of the problem.

b^2-4ac
$= 100$

$3x^2 - 8x = 3$
$-3 \quad -3$
$3x^2 - 8x - 3 = 0$
$a \quad b \quad c$

① Factor
② Graphing
③ Quad. Form.

Method 1: Quad Form

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
$= \frac{-(-8) \pm \sqrt{100}}{2(3)}$
$= \frac{8 \pm 10}{6}$
$= \frac{4 \pm 5}{3} = \frac{9}{3} = 3, \quad \frac{-1}{3}$

Method 2: Factor

$(3x+1)(x-3) = 0$

$3x+1=0$ $\quad x-3=0$
$-1 \quad -1 \quad +3 \quad +3$
$\frac{3x}{3} = \frac{-1}{3} \quad x = 3$
$x = -\frac{1}{3}$

Solution(s):

$x = 3$
$x = -\frac{1}{3}$

Why did you choose the two methods that you did and which do you feel is more efficient?