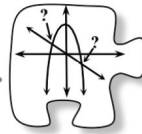


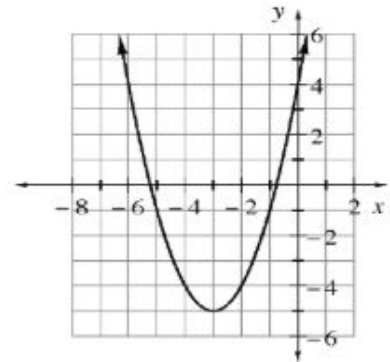
3.1.1 How can I solve the equation?

Strategies for Solving Equations



#1 SOLVING GRAPHICALLY

One of the big ideas of Chapter 2 was how to determine special points on the graph of a function. For example, you used the equation of a parabola written in graphing form to locate its vertex without graphing. But what about the locations of other points on the parabola? Consider the graph of $y = (x + 3)^2 - 5$ at right.



a. How many solutions does the equation $y = (x + 3)^2 - 5$ have? How is this shown on the graph?

b. How many solutions does the equation $(x + 3)^2 - 5 = 4$ have? How is this shown on the graph?

c. Use the graph to solve the equation $(x + 3)^2 - 5 = 4$. How did the graph help you solve the equation?

#2 ALGEBRAIC STRATEGIES

Solve the equation $(x + 3)^2 - 5 = 11$ in two different strategies.

Method 1

Method 2

#3 Three strategies your class or team may have used in problem 3-2 are:

- **Rewriting:** Using algebra to write a new equivalent equation that is easier to solve.
- **Looking Inside:** Reasoning about the value of the expression inside the function or parentheses.
- **Undoing:** Reversing or doing the opposite of an operation; for example, taking a square root to eliminate squaring.

Given: $\frac{x-5}{4} + \frac{2}{5} = \frac{9}{10}$

a. Ernie decides to multiply both sides of the equation by 20 so that his equation becomes $5(x - 5) + 8 = 18$. Which strategy does Ernie use? How can you tell?

b. Elle takes Ernie's equation and decides to subtract 8 from both sides to get $5(x - 5) = 10$. Which strategy does Elle use?

c. Eric looks at Elle's equation and says, "*I can tell that $(x - 5)$ must equal 2 because $5 \cdot 2 = 10$. Therefore, if $x - 5 = 2$, then x must be 7.*" What strategy does Eric use?

#4 Given: $x^2 + 2.5x - 1.5 = 0$

a. Rewrite the equation so that it has no decimals.

b. Rewrite your equation again, so that you can solve it without using the Quadratic Formula. Then solve your equation.

#5 Solve each equation, if possible, using any strategy. Name your strategy and check with your teammates to see what strategies they choose. Be sure to check your solutions algebraically.

a. $4|8x - 2| = 8$

Strategies used:

b. $3\sqrt{4x - 8} + 9 = 15$

Strategies used:

c. $(2y - 3)(y - 2) = -12y + 18$

Strategies used:

d. $\frac{5}{x} + \frac{1}{3x} = \frac{4x}{3}$

Strategies used:

e. $|3 - 7x| = -6$

Strategies used:

f. $\frac{6w-1}{5} - 3w = \frac{12w-16}{15}$

Strategies used:

g. $(x - 3)^2 - 2 = -5$

Strategies used:

h. $(x + 2)^2 + 4(x + 2) - 5 = 0$

Strategies used: