# Fun With Numbers!!!

Think about the following scenario. Someone tells you that you must choose an option for a contest:


8

Option 1: Your team is the best team in baseball. Your score in the contest is calculated by multiplying the number of runs that team scores in each game throughout the entire season.

6

Option 2: Your team is the worst team in baseball. Your score in the contest is calculated by adding the number of runs that team scores in each game throughout the entire season.

The option with the highest score at the end of the season wins. You get to pick your option, which one do you pick and why?

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# Unit E1 Lesson 8

Learning Target: Factor a quadratic to find the zeros of the function.

D.I.R.T

Factor.

-30
+5 -6
-1

1) $x^2 - x - 30$

$(x+5)(x-6)$

2) $12a^2b - 18ab^2$

$6ab$ $6ab$

$6ab(2a-3b)$

3) $5n^2 + 8n + 3$

15
+5 +3
8

$(N+\frac{5}{5})(N+\frac{3}{5})$

$(N+1)(5N+3)$

4) $4a^2 - 20a + 25$

100
-10 -10
-20

$(x-\frac{10}{2})(x-\frac{10}{2})$

$(2x-5)(2x-5)$

OR

$(2x-5)^2$

Solve.

5) $x + 3 = 0$

$-3 \quad -3$

$x = -3$

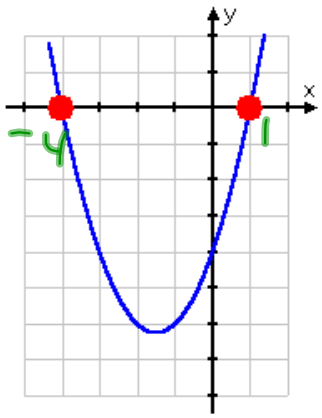
6) $3x - 5 = 0$

$+5 \quad +5$

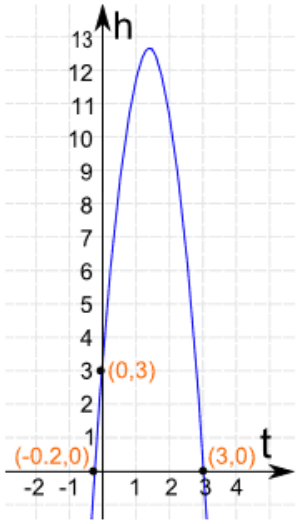
$\frac{3x}{3} = \frac{5}{3}$

$x = \frac{5}{3}$

# When I solve a quadratic equation, what am I really finding?




The graph of a quadratic is a parabola -- you are finding where the parabola touches the x-axis




Here is the graph of the Parabola $h = -5t^2 + 14t + 3$

It shows you the **height** of the ball vs **time**

Some interesting points:

(0,3) When t=0 (at the start) the ball is at 3 m

(-0.2,0) Says that -0.2 seconds BEFORE we threw the ball it was at ground level ... this never happened, so our common sense says to ignore it!

(3,0) Says that at 3 seconds the ball is at ground level.

So...if I have something factored, like (x + 5)(2x - 3) = 0, think back to the baseball contest -- what happened to the score for the option where you multiplied when your team had a shutout?

What do we know if we are multiplying factors together and get an answer of 0?

This is because of what is known as the

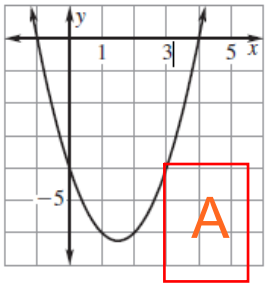

So...either x + 5 = 0 or 2x - 3 = 0

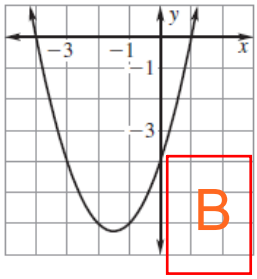
Example: Match the function with its graph

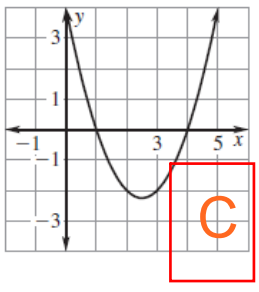
1) y = (x + 4)(x - 1)

2) y = (x - 4)(x + 1)

3) y = (x - 4)(x - 1)

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# Examples: Find the solution(s) to the following quadratic equations:

1) $x^2 - x - 12 = 0$

$(x+3)(x-4) = 0$

$x+3=0$ $\quad -3 \quad -3$

$x = -3$

$x-4=0$ $\quad +4 \quad +4$

$x = 4$

$-12$, $+3$, $-4$, $-1$

$\{-3, 4\}$

2) $4x^2 + 12x + 9 = 0$

$(x+\frac{3}{2})(x+\frac{3}{2}) = 0$

$(2x+3)(2x+3) = 0$

$2x+3=0$ $\quad -3 \quad -3$

$2x = -3$

$x = -\frac{3}{2}$

$2x+3=0$

$x = -\frac{3}{2}$

$36$, $+6$, $+6$, $12$

$\{-\frac{3}{2}\}$ DR

3) $25a^2 - 100 = 0$

$25(a^2 - 4) = 0$

$25(a+2)(a-2) = 0$

$25 = 0$

$a+2=0$ $\quad -2 \quad -2$

$a = -2$

$a-2=0$ $\quad +2 \quad +2$

$a = 2$

$\{-2, 2\}$

# Examples: Find the root(s) to the following quadratic equations using factoring:

1) $6x^2 - 18x - 18 = 6$

$-6 \quad -6$

$6x^2 - 18x - 24 = 0$

$6(x^2 - 3x - 4) = 0$

$6(x-4)(x+1) = 0$

$6 \neq 0$ $\quad x-4=0$ $\quad x+1=0$

$+4 \quad +4$ $\quad -1 \quad -1$

$x = 4$ $\quad x = -1$

$-4, +1, -4, -3$

$\{4, -1\}$

2) $7x^2 - 14x = -7$

$+7 \quad +7$

$\frac{7x^2}{7} - \frac{14x}{7} + \frac{7}{7} = \frac{0}{7}$

$7(x^2 - 2x + 1) = 0$

$7(x-1)(x-1) = 0$

$7 \neq 0$ $\quad x-1=0$

$+1 \quad +1$

$x = 1$

$1, -1, -1, -2$

$\{1_{DR}\}$

Examples: Find the x-intercepts of the Quadratic Equations.

1) $5x^2 - 44x + 120 = -30 + 11x$

2) $-4x^2 - 8x - 3 = -3 - 5x$

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# Examples: Find the zeros of each function

1) $y = (5x - 8)(5x + 8)$

$(5x-8)(5x+8) = 0$

$5x - 8 = 0$
$+8 \quad +8$
$\frac{5x}{5} = \frac{8}{5}$
$x = \frac{8}{5}$

$5x + 8 = 0$
$-8 \quad -8$
$\frac{5x}{5} = \frac{-8}{5}$
$x = -\frac{8}{5}$

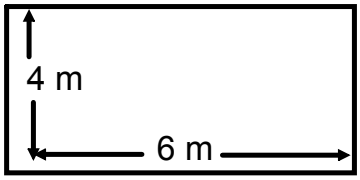
$\left\{\frac{8}{5}, -\frac{8}{5}\right\}$

2) $y = x^2 + 9$

## Application Problem:

1) Joe's rectangular garden is 6 meters long and 4 meters wide.

A) He wishes to increase the area of his garden by adding a strip of equal width all the way around the garden. Using the figure below, show the addition to the garden and label the width of the addition *w*.




B) When the addition is finished, the area of the garden is 48 $m^2$. Write an equation that represents the total area covered by the new, larger garden.

C) Solve for the width added to each side of the garden, *w*.

Assignment: Worksheet

## Attachments

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