

Day 3: Solving Quadratics by Factoring (a not 1)

Review: Solving Quadratics

1)  $\frac{10x^2}{2x} - \frac{2x}{2x} = 0$  GCF:  $2x$

$2x(5x-1) = 0$

$\frac{2x}{2} = 0 \Rightarrow x = 0$

$\frac{5x-1}{+1 +1} = 0 \Rightarrow 5x-1 = 0 \Rightarrow 5x = 1 \Rightarrow x = \frac{1}{5}$

Before solving a quadratic function, you must always make sure the factors are being multiplied together and set equal to  $\neq 0$ .

2)  $x^2 + 13x + 30 = 0$   $a=1$   $b=13$   $c=30$

~~$\frac{30}{3 \times 10}$~~   $\frac{30}{1 \ 30}$   $\frac{2 \ 15}{3 \ 10}$

$x^2 + 3x + 10x + 30$

	x	3
x	$x^2$	$3x$
10	$10x$	$30$

$(x+3)(x+10) = 0$

$x+3=0 \Rightarrow x=-3$      $x+10=0 \Rightarrow x=-10$

Solving Quadratics by Factoring

Solve the following quadratic equations.

1)  $2x^2 + 3x - 2 = 0$   $a=2$   $b=3$   $c=-2$

~~$\frac{-4}{4 \times 3}$~~   $\frac{-4}{1 \ -4}$   $\frac{-4}{-2 \ 2}$

$2x^2 + 3x - 2 \Rightarrow 2x^2 + 4x - 1x - 2$

<del>2x</del>	<del>2x</del>	<del>4x</del>
<del>-1</del>	<del>-1x</del>	<del>-2</del>

	x	2
2x	$2x^2$	$4x$
-1	$-1x$	$-2$

Factored Form:  $(2x-1)(x+2) = 0$

$2x-1=0 \Rightarrow \frac{2x}{2} = \frac{1}{2} \Rightarrow x = \frac{1}{2}$

$x+2=0 \Rightarrow x = -2$

Zeros:  $x = \frac{1}{2}, x = -2$

2)  $5x^2 + 14x - 3 = 0$   $a=5$   $b=14$   $c=-3$

~~$\frac{-15}{7 \times 15}$~~   $\frac{-15}{1 \ -15}$   $\frac{-15}{7 \ 15}$   $\frac{3 \ -5}{-3 \ 5}$

$5x^2 + 14x - 3 \Rightarrow 5x^2 - 1x + 15x - 3$

	5x	-1
x	$5x^2$	$-1x$
3	$15x$	$-3$

Factored Form:  $(x+3)(5x-1) = 0$

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

$5x-1=0 \Rightarrow \frac{5x}{5} = \frac{1}{5} \Rightarrow x = \frac{1}{5}$

Zeros:  $x = -3, \frac{1}{5}$

3)  $2x^2 + x - 6 = 0$   $a=2$   $b=1$   $c=-6$

~~$\frac{-12}{-3 \times 4}$~~   $\frac{-12}{3 \times 4}$   $2x^2 + x - 6 \rightarrow$   
 $2x - 3x + 4x - 6$

	$2x$	$-3$
$x$	$2x^2$	$-3x$
$2$	$4x$	$-6$

Factored Form:  $(x+2)(2x-3) = 0$

$x+2=0$   $\left\{ \begin{array}{l} 2x-3=0 \\ -2 \quad -2 \\ \hline x = -2 \end{array} \right. \left\{ \begin{array}{l} 2x-3=0 \\ +3 \quad +3 \\ \hline 2x=3 \\ \frac{2x}{2} = \frac{3}{2} \quad x = \frac{3}{2} \end{array} \right.$

Zeros:  $x = -2, \frac{3}{2}$

4)  $5x^2 - 11x + 3 = -3$   
 $+3 \quad +3$

$5x^2 - 11x + 6 = 0$   $a=5$   $b=-11$   $c=6$

~~$\frac{30}{-5 \times -6}$~~   $\frac{30}{1 \times 30}$   $5x^2 - 11x + 6 \rightarrow$   
 $5x^2 - 5x + 6x + 6$

	$x$	$-1$
$5x$	$5x^2$	$-5x$
$-6$	$6x$	$6$

Factored Form:  $(x-1)(5x-6) = 0$

$(x-1)=0$   $\left\{ \begin{array}{l} 5x-6=0 \\ +1 \quad +1 \\ \hline x = 1 \end{array} \right. \left\{ \begin{array}{l} 5x-6=0 \\ +6 \quad +6 \\ \hline 5x = \frac{6}{5} \\ \frac{5x}{5} = \frac{6}{5} \quad x = \frac{6}{5} \end{array} \right.$

Zeros:  $x = 1, x = \frac{6}{5}$

5)  $2x^2 - x - 1 = 0$   $a=2$   $b=-1$   $c=-1$

~~$\frac{-2}{-2 \times 1}$~~

	$x$	$-1$
$2x$	$2x^2$	$-2x$
$1$	$1x$	$-1$

Factored Form:  $(2x+1)(x-1) = 0$

$2x+1=0$   $\left\{ \begin{array}{l} x-1=0 \\ -1 \quad -1 \\ \hline 2x = -\frac{1}{2} \\ \frac{2x}{2} = \frac{-1}{2} \quad x = -\frac{1}{2} \end{array} \right. \left\{ \begin{array}{l} x-1=0 \\ +1 \quad +1 \\ \hline x = 1 \end{array} \right.$

Zeros:  $x = -\frac{1}{2}, x = 1$

6)  $4x^2 - 1 = 0 \rightarrow 4x^2 + 0x - 1 = 0$   
 $a=4$   $b=0$   $c=-1$

~~$\frac{-4}{2 \times 0}$~~   $\frac{-4}{-4 \times 1}$   $4x^2 + 2x - 2x - 1$

	$2x$	$1$
$2x$	$4x^2$	$2x$
$-1$	$-2x$	$-1$

Factored Form:  $(2x-1)(2x+1) = 0$

$2x-1=0$   $\left\{ \begin{array}{l} 2x+1=0 \\ +1 \quad +1 \\ \hline 2x = 1 \\ \frac{2x}{2} = \frac{1}{2} \quad x = \frac{1}{2} \end{array} \right. \left\{ \begin{array}{l} 2x+1=0 \\ -1 \quad -1 \\ \hline 2x = -\frac{1}{2} \\ \frac{2x}{2} = \frac{-1}{2} \quad x = -\frac{1}{2} \end{array} \right.$

Zeros:  $x = \frac{1}{2}, -\frac{1}{2}$