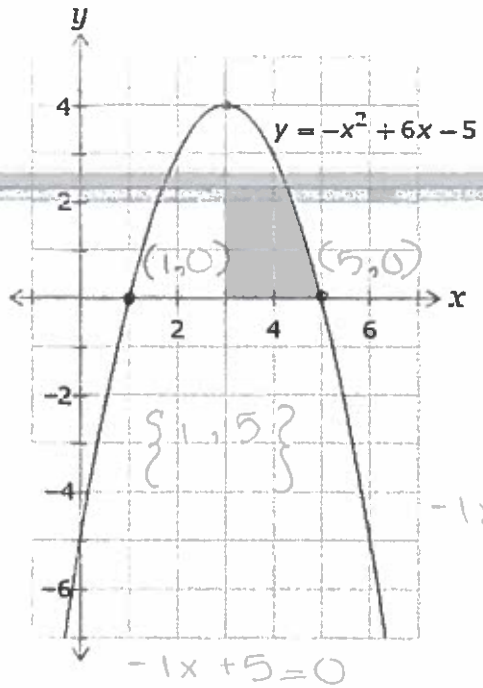
"Teacher"

Name _____ 1/2 Date April 11, 2018 **Section 2.Q.7**

Solve Quadratic Equations by Factoring



The solutions to a quadratic equation, when $y = 0$, are called the

roots, zeros, x-values of x-intercepts

<u>Ex. 1 - Solve by Factoring - AC Method</u>

* all x-ints have $y = 0$

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

a·c, add

$-1 \cdot -5 = 5$

$1 \cdot 5 = 5$

$1 + 5 = 6$

$-x^2 + 1x + 5x - 5 = 0$

$-1x(x-1) \quad 5(x-1)$

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

$-1x + 5 = 0$

$-5 \quad -5$

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

$x = 5$

$x - 1 = 0$

$+1 \quad +1$

$x = 1$

{1, 5}

<u>Ex. 2 - Solve by using the zero-product property.</u>

**If either factor equals 0, the equation equals 0.

$(4x + 1)(x + 9) = 0$

$4x + 1 = 0$

$-1 \quad -1$

$\frac{4x}{4} = \frac{-1}{4}$

$x = -\frac{1}{4}$

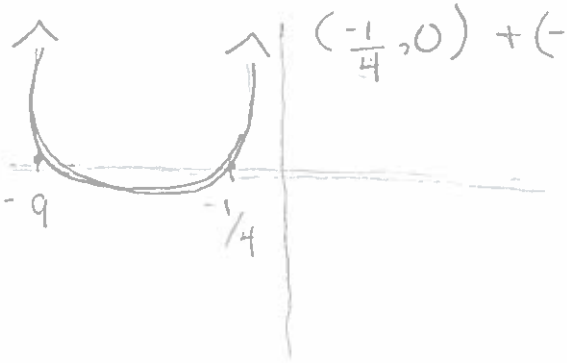
$x + 9 = 0$

$-9 \quad -9$

$x = -9$

$\left\{-\frac{1}{4}, -9\right\}$

$\left(-\frac{1}{4}, 0\right) + (-9, 0)$



<u>You Try 3</u> $(2x - 3)(x + 1) = 0$

$2x - 3 = 0$

$+3 \quad +3$

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

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

$x + 1 = 0$

$-1 \quad -1$

$x = -1$

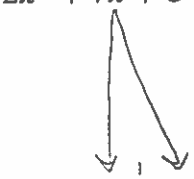
$\left\{\frac{3}{2}, -1\right\}$

x-int $\left(\frac{3}{2}, 0\right) + (-1, 0)$

Ex. 4 - AC Method aka Split the Middle REVIEW

$ax^2 + bx + c$

$2x^2 + 7x + 6$



Multiply $a \cdot c$. Find factors of ac that also add to b.

$2 \cdot 6 = 12$	$b = 7$
$1 \cdot 12$	$1 + 12 = 13$
$2 \cdot 6$	$2 + 6 = 8$
$3 \cdot 4$	$3 + 4 = 7$

Both (+) because multiplying to (+) and adding to (+)

$2x^2 + 3x + 4x + 6$

Split the bx term into the like terms using the numbers you found.

$x(2x + 3) + 2(2x + 3)$

Pull out the GCF from the left 2 terms and from the right 2 terms.

$x(2x + 3) = 2x^2 + 3x$ $\quad$ $2(2x + 3) = 4x + 6$

$(x + 2)(2x + 3)$

Your two binomials come from what's the same and what's leftover.

Ex. 5 Find the roots of the quadratic equation.

$f(x) = 3x^2 - 8x + 4 = 0$

$a \cdot c = 3 \cdot 4 = 12$

$3x^2 - 2x - 6x + 4 = 0$

$x(3x - 2) - 2(3x - 2)$

$(x - 2)(3x - 2)$

$\{\frac{2}{3}, 2\}$

$(\frac{2}{3}, 0)(2, 0)$

12
$1 \cdot 12$
$2 \cdot 6$
$3 \cdot 4$

add to (-8)

$-2 + -6 = -8$

$3x - 2 = 0$

$+2 \quad +2$

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

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

$x - 2 = 0$

$+2 \quad +2$

$x = 2$

Steps

1) Set the function = 0.
2) Factor the function.
3) Set each factor = 0.
4) Solve each equation.
5) Write your roots/zeros as a solution set.

**You can also write the x-intercepts as ordered pairs.

You Try 6 Find the zeros of the quadratic function.

$y = 12x^2 - 5x - 2$

$a \cdot c = 12 \cdot (-2) = -24$

$12x^2 + 3x - 8x - 2 = 0$

$3x(4x + 1) - 2(4x + 1)$

$(4x + 1)(3x - 2)$

$\{\frac{2}{3}, -4\}$

$(\frac{2}{3}, 0)(-4, 0)$

-24
$1 \cdot 24$
$2 \cdot 12$
$3 \cdot -8$
$4 \cdot 6$

add to (-5)

$-3 + -8 = -5$

$3x - 2 = 0$

$+2 \quad +2$

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

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

$4x + 1 = 0$

$-1 \quad -1$

$\frac{4x}{4} = \frac{-1}{4}$

$x = -4$