Solve a Quadratic Equation by Factoring

$ax^2+bx+c=0$

Zero Product Property

If (a)(b)=0, then a=0 or b=0

Steps to solve:

1. Move all terms to one side of the equation. Make it set equal to zero.
2. Factor Completely $(x+\#)(x+\#)=0$
3. Apply zero-product property by setting each factor =0. Solve for x. $x+\#=0$ $x+\#=0$

Examples: Solve by factoring

1. $x^2+18=9x$

$-9x \quad -9x$

$x^2-9x+18=0$

$18: -6, -3$ ($-6-3=-9$)

$(x-6)(x-3)=0$

$x-6=0 \quad +6 \quad +6$

$x=6$

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

$x=3$

2. $2x^2+6x=-4$

$+4 \quad +4$

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

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

$2(x+2)(x+1)=0$

$2 \neq 0$

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

$x=-2$

$x+1=0 \quad -1 \quad -1$

$x=-1$

3. $6x^2=8x$

$-8x \quad -8x$

$6x^2-8x=0$

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

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

$x=0$

$3x-4=0 \quad +4 \quad +4$

$\frac{3x}{3}=\frac{4}{3}$

$x=4/3$

Algebra 2

Name_____ ID: 1

Solve by Factoring - CW

Date_____ Period____

Solve each equation by factoring.

1) $(3v - 1)(v - 6) = 0$

$3v-1=0$ $v-6=0$

$+1\ +1$ $+6\ +6$

$3v=1$ $v=6$

$v=\frac{1}{3}$

2) $(m + 2)(m - 7) = 0$

$m+2=0$ $m-7=0$

$-2\ -2$ $+7\ +7$

$m=-2$ $m=7$

3) $(n + 2)(n + 1) = 0$

$n+2=0$ $n+1=0$

$-2\ -2$ $-1\ -1$

$n=-2$ $n=-1$

4) $(3r + 1)(r + 6) = 0$

$3r+1=0$ $r+6=0$

$-1\ -1$ $-6\ -6$

$\frac{3r}{3}=\frac{-1}{3}$ $r=-6$

$r=-1/3$

5) $x^2 - 7x + 6 = 0$

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

6, -6, -1, -7

$x-6=0$ $x-1=0$

$+6\ +6$ $+1\ +1$

$x=6$ $x=1$

6) $k^2 - 2k - 35 = 0$

-35, -7, $+5$, -2

$(k-7)(k+5)=0$

$k-7=0$ $k+5=0$

$k=7$ $k=-5$

7) $9x^2 - 9x + 2 = 0$

18, -6, -3, -9

	$3x$	-1
$3x$	$9x^2$	$-3x$
-2	$-6x$	2

$(3x-1)(3x-2)=0$

$3x-1=0$ $3x-2=0$

$+1\ +1$ $+2\ +2$

$\frac{3x}{3}=\frac{1}{3}$ $\frac{3x}{3}=\frac{2}{3}$

$x=1/3$ $x=2/3$

8) $3a^2 - 22a + 7 = 0$

21, -21, -1, -22

	$3a$	-1
a	$3a^2$	$-1a$
-7	$-21a$	7

$(3a-1)(a-7)=0$

$3a-1=0$ $a-7=0$

$+1\ +1$ $+7\ +7$

$\frac{3a}{3}=\frac{1}{3}$ $a=7$

$a=1/3$

9) $5x^2 + 13x + 1 = 7$

$-7\ -7$

$5x^2+13x-6=0$

-30, 15, -2, 13

	$5x$	-2
x	$5x^2$	$-2x$
3	$15x$	-6

$(5x-2)(x+3)=0$

$5x-2=0$ $x+3=0$

$+2\ +2$ $-3\ -3$

$\frac{5x}{5}=\frac{2}{5}$ $x=-3$

$x=2/5$

10) $3n^2 + 8n + 2 = -2$

$+2\ +2$

$3n^2+8n+4=0$

12, 6, 2, 8

	$3n$	2
n	$3n^2$	$2n$
2	$6n$	4

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

$3n+2=0$ $n+2=0$

$-2\ -2$ $-2\ -2$

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

$n=-2/3$

Algebra 2

Name_____ ID: 1

Solve by Factoring - HW

Date_____ Period____

Solve each equation by factoring.

1) $(b+2)(b-3)=0$

2) $(k-5)(7k+2)=0$

3) $(b-1)(b-8)=0$

4) $(2m-5)(m-6)=0$

5) $x^2+13x+42=0$

6) $k^2+3k-40=0$

7) $7m^2+15m+2=0$

8) $2b^2-3b-9=0$

9) $6m^2-7m-3=7$

10) $5x^2+21x+6=2$