Factoring to Find Solutions

To solve a quadratic, set it (or get it) equal to zero and then factor.

After factoring, set each factor equal to zero.

Solve: $f(x) = 5x^2 - 10x$

$5x(x - 2) = 0$ Factor by GCF

$5x = 0$ and $x - 2 = 0$ Set each term = 0

$x = 0$ and $x = 2$ Solve for x

5x and (x – 2) are the factors.

x = 0 and x = 2 are the zeros.

Ex) $g(x) = x^2 - 10x + 9$

$(x - 9)(x - 1)$	Factor
$x - 9 = 0$ and $x - 1 = 0$	Set each term = 0
$x = 9$ and $x = 1$	Solve for x

Ex) $3x^2 - 8x = x - 6$

$3x^2 - 9x + 6 = 0$	Get equation equal to 0
$3(x^2 - 3x + 2) = 0$	Factor the GCF
$3(x - 2)(x - 1) = 0$	Factor the parenthesis
$x - 2 = 0$ and $x - 1 = 0$	Set each term = 0
$x = 2$ and $x = 1$	Solve for x

Ex) $g(x) = x^2 - 6x + 9$

$(x - 3)(x - 3)$ Factor

$x - 3 = 0$ and $x - 3 = 0$ Set each term = 0

$x = 3$ and $x = 3$ Solve for x

$x = 3$ is called a double root because it is the solution for both factors.

Ex) $3x^2 + 8x = -4$

$3x^2 + 8x + 4 = 0$ Get equation equal to 0

$(x + 2)(x + 6)$ Bottom's Up: ac = 12

$(x + \frac{2}{3})(x + \frac{6}{3})$ Divide by leading coeff.

$(x + \frac{2}{3})(x + 2)$ Reduce each fraction

$(3x + 2)(x + 2)$ Bring the bottom up

$3x + 2 = 0$ and $x + 2 = 0$ Set each factor = 0

$x = -3/2$ and $x = -2$ Solve for x

Ex) $-4x^2 - 22x - 16 = 8$

$-4x^2 - 22x - 24 = 0$ Get equation equal to 0

$-2(2x^2 + 11x + 12)$ Factor the GCF

$-2(x^2 + 11x + 24)$ Multiply ac: 2(12) = 24

$-2(x + 3)(x + 8)$ Find the factors

$-2(x + \frac{3}{2})(x + \frac{8}{2})$ Divide each factor by a.

$-2(x + \frac{3}{2})(x + 4)$ Reduce fractions

$-2(2x + 3)(x + 4)$ Bring the bottom up

$2x + 3 = 0$ and $x + 4 = 0$ Set each factor = 0

$x = -3/2$ and $x = -4$ Solve for x