9.4 – 9.7 Factoring Quadratic Equations
Study Guide

9.4: Factor Using the GCF:

You should be able to:

1. Identify the GCF of a quadratic expression and factor using this method.

Ex: $2x^2 - 4x$
$2x(x-2)$

TRY SOME:
Factor using the GCF:

Ex: $16y^2 - 4y$ **Ex:** $3xy + 8xy^2$

2. Solve a quadratic equation in factored form.

Ex: Solve: $(3x-1)(x+2) = 0$ *Use the zero-product property to figure out the x values that would make the quantities equal 0.

$3x - 1 = 0$
$+1 \quad +1$
$\frac{3x}{3} = \frac{1}{3}$
$\boxed{x = \frac{1}{3}}$

$x + 2 = 0$
$x + 2 = 0$
$-2 \quad -2$
$\boxed{x = -2}$

TRY SOME: (Hint! They are already factored! Just use the zero-product property!)
Solve:

Ex: $x(2x-5) = 0$ **Ex:** $x(3x-7)(4x-1) = 0$

3. Solve a quadratic equation by factoring using the GCF first!

Ex: $7x^2 + 21x = 0$ Since the equation equals 0 you are ready to factor.
$7x(x+3) = 0$ Factor using GCF of $7x$
So either $7x = 0$ or $x + 3 = 0$
$\boxed{x = 0}$ or $\boxed{x = -3}$

TRY SOME: (Hint! 1. Make sure it equals 0, 2. Factor, 3. ZPP!)
Solve:

Ex: $8x^2 - 16x = 0$ **Ex:** $2x^2 = -7x$

9.5: Factor Quadratics in the Form $y = x^2 + bx + c$ –

Ex: $x^2 - 7x + 12$ ***You are In Search Of two numbers that multiply to 12, but add to −7**
$\boxed{(x-3)(x-4)}$

TRY SOME:
Factor:

Ex. $x^2 - 2x - 24$ **Ex:** $x^2 + 9x + 18$ **Ex:** $x^2 - 9x + 20$

Solve quadratic equations by factoring first.

Ex: $x^2 - 7x + 12 = 0$ Factor first. *Remember it must equal 0 before you can begin factoring.
$(x-3)(x-4) = 0$ Solve by using the zero-product property shown above.
$\boxed{x = 3}$ or $\boxed{x = 4}$

TRY SOME: (Hint! 1. Make sure it equals 0, 2. Factor, 3. ZPP!)
Factor:

Ex: $x^2 - 17x + 60 = 0$ **Ex:** $x^2 + 8x = -12$

9.6: Factor Quadratics in the Form $y = ax^2 + bx + c$ –

You should be able to:

1. Factor quadratics in the form $y = ax^2 + bx + c$ into two binomials. Be sure to check outer and inner!

Ex: $3x^2 + x - 2$

$(3x - 2)(x + 1)$ *The parenthesis must open with $3x$ and x in order to get $3x^2$. The only digits to consider using in the second slots are 2 and 1 to get -2. Then check outer and inner to make these parts add to $1x$.

TRY SOME:

Factor:

Ex: $5x^2 - 6x + 1$

Ex: $3x^2 + 13x + 4$

2. Solve quadratics in the form $y = ax^2 + bx + c$ by factoring first.

Solve:

$3x^2 + x - 2 = 0$ Ready to factor since it equals 0.

$(3x - 2)(x + 1) = 0$ Factor.

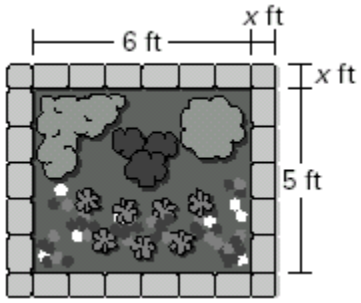
$x = -1$ or $x = \frac{2}{3}$ Solve.

TRY SOME: (Hint! 1. Make sure it equals 0, 2. Factor, 3. ZPP!)

Ex: Solve: $2x^2 - 3x - 35 = 0$

Ex: Solve: $4x^2 + 11x = 3$

Ex: You are designing a rectangular flower bed that you will border using brick pavers. The width of the border around the bed will be the same on every side, as shown. The area of the flower bed and border is 72 square feet. What is the width of the border?



9.7: Factor the difference two squares $a^2 - b^2$

You should be able to:

1. Factor the difference of two squares $a^2 - b^2$ into $(a + b)(a - b)$

   Ex: $9x^2 - 1$ Since $9x^2$ and 1 are both perfect squares and being subtracted, this binomial is in the form: $a^2 - b^2$ which means it factors into $(a + b)(a - b)$

   Since a^2 is $9x^2$, then $a = 3x$, and b^2 is 1, then $b = 1$

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

TRY SOME:

Ex: $4x^2 - 25$ **Ex:** $16y^2 - 49$

2. Solve by factoring using the difference of two squares.

Solve:

$9x^2 - 1 = 0$	Is ready to be factored because it equals 0.
$(3x + 1)(3x - 1) = 0$	How to factor Difference of two squares.
$3x + 1 = 0$ and $3x - 1 = 0$	Set each quantity equal to 0.
$x = \frac{1}{3}$ and $x = \frac{-1}{3}$	Solve each by isolating x using reverse PEMDAS.

TRY SOME: (Hint! 1. Make sure it equals 0, 2. Factor, 3. ZPP!)

Ex: $4x^2 - 25 = 0$ **Ex:** $16y^2 = 49$