9.4 – 9.5 Factoring Quadratic Equations
Study Guide Questions

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: $2x^2 - 4x$ becomes $\boxed{2x(x-2)}$ when factored. The circled portion would be your answer.

Factor using the GCF:

Ex: $-4y + 16y^2$

$-4y(1 - 4y)$

Ex: $3xy + 8xy^2$

$xy(3 + 8y)$

2. Solve a quadratic equation in factored form.

Ex: $(3x-1)(x+2) = 0$, since you are multiplying two quantities and the answer is 0, then one of the two quantities being multiplied must be equal to zero. This means either $3x - 1 = 0$ or $x + 2 = 0$

If: $3x - 1 = 0$ you would:

$+1 \quad +1$ first add 1 to both sides

$\frac{3x}{3} = \frac{1}{3}$ then divide by three so:

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

If: $x + 2 = 0$ you would:

$x + 2 = 0$

$-2 \quad -2$ subtract 2 so:

$\boxed{x = -2}$

Solve:

Ex: $x(2x-5) = 0$

$x = 0$ or $x = \frac{5}{2}$

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

$x = 0$, $x = \frac{7}{3}$ or $x = ¼$

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

Ex: $7x^2 + 21x = 0$

$7x(x+3) = 0$ Factor using GCF of $7x$

So either $7x = 0$ or $x + 3 = 0$

$\boxed{x = 0}$ or $\boxed{x = -3}$

Solve:

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

$8x(x - 2) = 0$
$8x = 0$ or $x - 2 = 0$
$\boxed{x = 0 \text{ or } x = 2}$

Ex: $2x^2 = -7x$

$2x^2 + 7x = 0$
$x(2x + 7) = 0$
$\boxed{x = 0 \text{ or } x = \frac{7}{2}}$

4. Use the vertical motion model to solve problems involving a problem's height and time. ($h = -16t^2 + vt + s$)

Ex: An object is launched from the ground with an initial vertical velocity of 32 feet per second. How long before the object reaches the ground?

$h = -16t^2 + vt + s$	Set up equation.
$h = -16t^2 + 32t$	Substitute. (Initial height (s) is zero, and initial velocity (v) is 32 feet per second.)
$0 = -16t^2 + 32t$	Replace h with 0 since that will be the object's height when it reaches the ground.
$0 = -16t(t - 2)$	Factor using the GCF.
$t = 0$ or $t = 2$	Solve. Choose the answer that makes sense.

$\boxed{t = 2}$

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

You should be able to:

1. Factor trinomials in the form $x^2 + bx + c$ by factoring into two binomials in the form:

$(x + p)(x + q)$

*To find p and q you find the factors of c that add up to b.

Ex: $x^2 - 7x + 12$ becomes $\boxed{(x - 3)(x - 4)}$ when factored because –4 and –3 first multiply to get +12, but also add up to –7.

Factor:

Ex. $x^2 - 2x - 24$

$(x - 6)(x + 4)$

Ex: $-x^2 - 9x - 18$

$-1(x + 6)(x + 3)$

Ex: $3x^2 + 9x + 6$

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

2. Solve quadratic equations by factoring first.

Ex: $x^2 - 7x + 12 = 0$ Factor first
$(x-3)(x-4) = 0$ Solve
$\boxed{x = 3}$ or $\boxed{x = 4}$

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

$(x - 5)(x - 12) = 0$
$x = 5$ or $x = 12$

Ex: $x^2 + 8x = -12$

$x^2 + 8x + 12 = 10$
$(x + 6)(x + 2) = 0$
$x = -6$ or $x = -2$

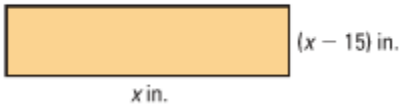
3. Use the vertical motion model to solve problems involving a problem's height and time. ($h = -16t^2 + vt + s$)

Ex: An object is launched from a height of 48 feet with an initial vertical velocity of 32 feet per second. How long before the object reaches the ground?

$h = -16t^2 + vt + s$	Set up equation.
$h = -16t^2 + 32t + 48$	Substitute. (Initial height is 48 feet, and initial velocity is 32 feet per second.)
$0 = -16t^2 + 32t + 48$	Replace h with 0 since that will be the object's height when it reaches the ground.
$0 = -16(t^2 - 2t - 3)$	Factor out GCF so coefficient of t^2 is 1.
$0 = -16(t - 3)(t + 1)$	Factor.
$t = 3$ or $t = -1$	Solve.
$\boxed{t = 3 \text{sec}}$	Choose the answer that makes sense.

4. Find the missing dimension of a rectangle given the area by factoring.

Ex: Area: 100 square inches



$A = bh$
$100 = x(x - 15)$
$100 = x^2 - 15x$
$0 = x^2 - 15x - 100$
$0 = (x - 20)(x + 5)$
$x = 5$