Name:_____ Date:_____

Notes
Algebra Section 9.4
Pages 575-580

Goal: "You will solve polynomial equations"

Vocabulary:

Roots: The solutions of a zero-product property.

Zero-product property: If $ab=0$, then either a or b has to =0.

Solve using the zero-product property:

Ex: $(x + 2)(x + 4) = 0$

Either the first set of parentheses or the second set of parentheses has to =0
For the first set of parentheses to =0 then x has to = -2
For the second set of parentheses to =0 then x has to = -4

So, $x=$ -2 or $x=$ -4

Solve:

Ex: $(x - 5)(x - 1) = 0$

$x = 5$ $x = 1$

Ex: $(x + 3)(x - 5) = 0$

$x = -3$ $x = 5$

Factor by finding the Greatest Common Factor:

Ex: $12x + 42y$

$6(2x + 7y)$

What do both terms have in common that you can divide by?
Look for the **greatest** factor they have in common. 6

When you factor by using the GCF you are essentially: Un-Distributing

Which means you could check your answer by: Distributing

Ex: $4x^4 + 24x^3$

$4x^3(x + 6)$

Ex: $14m + 35n$

$7(2m + 5n)$

Ex: $8x + 12y$

$4(2x + 3y)$

Ex: $14y^2 + 21y$

$7y(2y + 3)$

Ex: $6x^2y + 9xy^2$

$3xy(2x + 3y)$

Ex: $4t^2 - 2t$

$2t(2t - 1)$

Solve by factoring first:

Ex: $2x^2 + 8x = 0$

$2x(x + 4) = 0$
$2x = 0$ or $x + 4 = 0$
$x = 0$ or $x = -4$

Ex: $3x^2 + 18x = 0$

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

Ex: $a^2 + 5a = 0$

$a(a + 5) = 0$
$a = 0$ or $a + 5 = 0$
$a = 0$ or $a = -5$

Ex: $3s^2 - 9s = 0$

$3s(s - 3) = 0$
$3s = 0$ or $s - 3 = 0$
$s = 0$ or $s = 3$

Solve by factoring:

Ex: $6n^2 = 15n$

$6n^2 - 15n = 0$
$3n(2n - 5) = 0$
$n = 0$ or $n = \frac{5}{2}$

Ex: $4x^2 = 2x$

$x = 0$ or $x = ½$

Ex: $4s^2 = 14s$

$s = 0$ or $s = \frac{7}{2}$

Vertical Motion Model:

h = Height (feet)

t = time (seconds)

v = Initial Velocity (feet/second)

s = initial height (Feet)

$$h = -16t^2 + vt + s$$

Ex: A startled armadillo jumps straight into the air with an initial velocity of 14 ft/s. After how many seconds does it land back on the ground?

$h = -16t^2 + vt + s$
$h = -16t^2 + 14t$ ($s = 0$ since he starts on the ground)
$h = -2t(8t - 7)$ Factor using GCF
$0 = -2t(8t - 7)$ Replace h with 0 since that would be his height when he reaches the ground again
$t = 0$ or $t = \frac{7}{8}$ $t = 0$ stands for when the armadillo first jumps, so he returns to the ground after seven-eighths of a second.

Ex: A dolphin jumped out of the water with an initial velocity of 32 ft/s. How many seconds does it take for the dolphin to re-enter the water?

$h = -16t^2 + 32t$
$t = 0$ or $t = 2$ 2 seconds to return back to the water.