Name: _____ Date: _____

Learning Goal 4.2	Given a quadratic equation, find the values of solution(s) by factoring, completing the square or using the quadratic formula.

- Root - because you may need to use a radical to find the answer
- Solution
- Zero - because $y=0$
- x –Intercept - where $y=0$

Example Solve the following quadratic equations using factoring.

1 24
2 12
3 8
4 6

__ x __ = -24
__ + __ = 11

a. $x^2 - 6x = 16$

-8 x 2 = -16
-8 + 2 = -6

$-16 \quad -16$

$x^2 - 6x - 16 = 0$

$(x-8)(x+2) = 0$

$x = 8$ $\quad x = -2$

b. $x^2 - 9 = 0$

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

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

$x = -3$

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

$x = 3$

c. $11x - 24 = -x^2$

$+x^2 \quad +x^2$

$x^2 + 11x - 24 = 0$

Not factorable

d. $3x^2 + 3x - 6 = 0$

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

2 x -1 = -2
2 + -1 = 1

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

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

$x = -2$

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

$x = 1$

e. $\frac{1}{2}x^2 - x = 4$

$-4 \quad -4$

$\frac{1}{2}x^2 - x - 4 = 0$

$\frac{1}{2}(x^2 - 2x - 8) = 0$

-4 x 2 = -8
-4 + 2 = -2

$\frac{1}{2}(x-4)(x+2) = 0$

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

$x = 0$

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

$x = -2$

f. $0.49x^2 = 36$

$-36 \quad -36$

$0.49x^2 - 36 = 0$

$\frac{49}{100}x^2 - 36 = 0$

$\left(\frac{7}{10}x + 6\right)\left(\frac{7}{10}x - 6\right) = 0$

$\frac{7}{10}x - 6 = 0$

$\frac{7}{10}x = 6$

$7x = 60$

$x = \frac{60}{7}$

$x = -\frac{60}{7}$

Assignment p.229 # 1 – 12, 17, 19, 28, 30 Quiz Next Day!

g. $-2(x+3)^2 + 12(x+3) + 14 = 0$

let $y = x+3$

$-2y^2 + 12y + 14 = 0$

$-2(y^2 - 6y - 7) = 0$

$-2(y-7)(y+1) = 0$

$y-7=0$ $\quad y+1=0$

$y=7$ $\quad y=-1$

$x+3=7$ $\quad x+3=-1$

$x=4$ $\quad x=-4$

h. $4(x-2)^2 = 0.25$

let $y = x-2$

$4y^2 = \frac{25}{100} = \frac{1}{4}$

$4y^2 - \frac{1}{4} = 0$

$\left(2y+\frac{1}{2}\right)\left(2y-\frac{1}{2}\right) = 0$

$2y+\frac{1}{2}=0$ $\quad 2y-\frac{1}{2}=0$

$2y=-\frac{1}{2}$ $\quad 2y=\frac{1}{2}$

$y=-\frac{1}{4}$ $\quad y=\frac{1}{4}$

$x-2=-\frac{1}{4}$ $\quad x-2=\frac{1}{4}$

$x=-\frac{9}{4}$ $\quad x=\frac{9}{4}$

Example A waterslide ends with the slider dropping into a deep pool of water. The path of the slider after leaving the lower end of the slide can be approximated by the quadratic function

$$h(d) = -\frac{1}{6}d^2 - \frac{1}{6}d + 2$$

where *h* is the height above the surface of the pool and *d* is the horizontal distance the slider travels from the lower end of the slide, both in feet. What is the horizontal distance the slider travels before dropping into the pool after leaving the lower end of the slide?

↳ $h=0$

$-\frac{1}{6}d^2 - \frac{1}{6}d + 2 = 0$

$-\frac{1}{6}(d^2 + d - 12) = 0$

$-\frac{1}{6}(d+4)(d-3) = 0$

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

$d=-4$ $\quad d=3$

no -ve distances

The slider will shoot out 3 m horizontally before hitting the water.