

## Lesson 15 - Using the Quadratic Formula

### Answer Key

1.  $b^2 - 4b + 3 = 0$

$a = 1$

$b = -4$

$c = 3$

The discriminant is

$$b^2 - 4ac$$

$$(-4)^2 - 4(1)(3) = 16 - 12 = \boxed{4}$$

2 solutions (rational answers)

2.  $2n^2 + 7 = -4n + 5$

$$2n^2 + 4n + 2 = 0$$

$a = 2$

$b = 4$

$c = 2$

The discriminant is

$$b^2 - 4ac$$

$$(4)^2 - 4(2)(2) = 16 - 16 = \boxed{0}$$

1 solution as a double root

3.  $x - 3x^2 = 5 + 2x - x^2$

$$0 = 2x^2 + x + 5$$

$a = 2$

$b = 1$

$c = 5$

$$b^2 - 4ac$$

$$1^2 - 4(2)(5)$$

$$1 - 40 = \boxed{-39}$$

no real

solutions

4.  $4q + 7 = q^2 - 5q + 1$

$$0 = q^2 - 9q - 6$$

$a = 1$

$b = -9$

$c = -6$

$$b^2 - 4ac$$

$$(-9)^2 - 4(1)(-6)$$

$$81 + 24 = \boxed{105}$$

2 solutions

irrational  
answers

5. 1 real solution  $\Rightarrow$  also the vertex  
(double root)

6. no real solutions

7. 2 real solutions

8. 1 solution (double root)

9.  $f(x) = x^2 - 7$

a.  $x = \pm\sqrt{7}$

b.  $(x - \sqrt{7})(x + \sqrt{7})$

c.  $(x - \sqrt{7})(x + \sqrt{7})$

$$x^2 - \sqrt{7}x + \sqrt{7}x - 7$$

$$x^2 - 7$$

#9 and #10  
are not on  
the quiz  
on Thurs.

10.  $f(x) = -2x^2 + x + 5$

a.  $a = -2$       $x = \frac{-1 \pm \sqrt{1^2 - 4(-2)(5)}}{2(-2)}$

$b = 1$

$c = 5$

$$x = \frac{-1 \pm \sqrt{41}}{-4} = \frac{1 \pm \sqrt{41}}{4}$$

b.  $\boxed{-2} \left(x - \frac{1 + \sqrt{41}}{4}\right) \left(x + \frac{1 + \sqrt{41}}{4}\right)$

$\downarrow$   
This is the factored out a.

$$c. f(x) = -2 \left( x - \frac{1 + \sqrt{41}}{2} \right) \left( x - \frac{1 - \sqrt{41}}{4} \right)$$

$$f(x) = -2 \left( x^2 - \frac{1 + \sqrt{41}}{4} x + \frac{1 - \sqrt{41}}{4} x - \frac{5}{2} \right)$$

$$= -2 \left( x^2 - \frac{1}{2} x - \frac{5}{2} \right)$$

FYI:  $\left( \frac{1 + \sqrt{41}}{4} \right) \left( \frac{1 - \sqrt{41}}{4} \right) =$

$$\frac{1 - 41}{16} = \frac{-40}{16} = -\frac{5}{2}$$