Starting Unit 5 Checklist:

- pick up a new textbook
- pay $7 if you brought it
- put your name on textbook
- store old textbook on the back shelf
- get a couple post-it notes for marking notes and homework sections
- get a calculator and a high lighter for the notes

SOLVING QUADRATIC EQUATIONS page 1

UNIT 5

Students understand that the quadratic formula can be found by completing the square and use the symmetry in the graph of a parabola to identify how the x-coordinate for the vertex can be seen in the quadratic formula. Students solve quadratic equations by factoring, finding square roots, completing the square, and by using the quadratic formula. Students determine the number of rational, real, and non-real solutions by factoring or solving the equation and also by using the graph.

Identified Learning Targets:

5.1 I can use tables and graphs to solve quadratic equations including real-world situations and translate between representations.

5.2 I can represent real-world situations with quadratic equations and solve using appropriate methods. Find real and non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context.

5.3 I can determine the number of real and non-real solutions for a quadratic equation.

5.4 I can represent relationships involving quadratic inequalities in multiple ways, find solutions and interpret these solutions to solve real-world situations.

Embedded throughout the unit:

- I understand how to verify that an answer is a solution and can interpret the solution in the context of the situation.
- I can demonstrate understanding of the real and non-real number systems and mathematical operations using expressions from these number systems.

Section 5.1A

To **solve the quadratic equation** $f(x) = 0$, means to find the values of x that make the equation true. When $y = 0$ in an ordered pair, the point is on the x-axis. A solution to the quadratic equation $f(x) = 0$ is also called an x-intercept or zero or root.

To solve a quadratic equation $g(x) = k$, where $k \neq 0$, we need to find the values of x, where the function is equal to k. These values will not be on the x-axis but will be on the horizontal line $y = k$.

This section provides the opportunity to explore these concepts.

1) Find the solutions to the quadratic equation $f(x) = 0$. The graph of $f(x)$ is provided to the right.

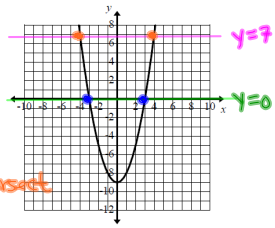
When $f(x) = 0$, $x =$ -3 and $x =$ 3.

These values of x are called the solutions to the equation $f(x) = 0$.

2) Find the solutions to the quadratic equation $f(x) = 7$. The graph of $f(x)$ is provided to the right.

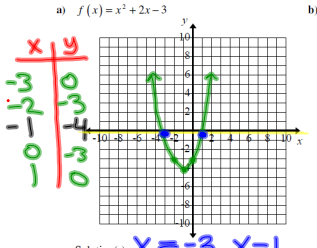
When $f(x) = 7$, $x =$ -4 and $x =$ 4.

These values of x are called the solutions to the equation $f(x) = 7$.



3) Graph the function $f(x)$ below. Use the graph to identify the solutions to $f(x) = 0$. Verify your results algebraically.

a) $f(x) = x^2 + 2x - 3$



x	y
-3	0
-2	-3
-1	-4
0	-3
1	0

Solution(s): $x = -3$, $x = 1$

Verify: Plug $x = -3$ into $x^2 + 2x - 3$

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

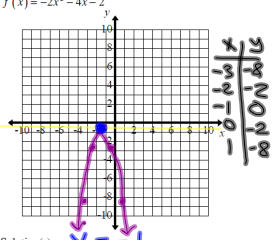
$0 = 0$ ✓

Plug $x = 1$ into $x^2 + 2x - 3$

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

$0 = 0$ ✓

b) $f(x) = -2x^2 - 4x - 2$



x	y
-3	-8
-2	-2
-1	0
0	-2
1	-8

Solution(s): $x = -1$

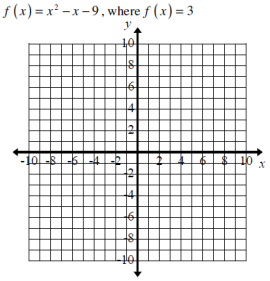
Verify: Plug $x = -1$ into $-2x^2 - 4x - 2$

$-2(-1)^2 - 4(-1) - 2 = 0$

$0 = 0$ ✓

4) Graph the function $f(x)$ below. Use the graph to identify the solutions to $f(x) = k$. Verify your results algebraically.

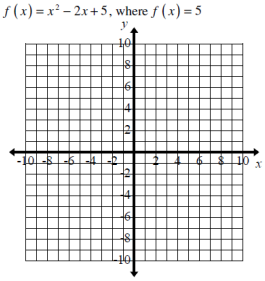
a) $f(x) = x^2 - x - 9$, where $f(x) = 3$



Solution(s): _____

Verify:

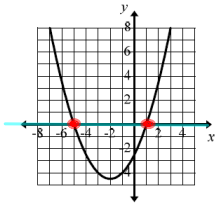
b) $f(x) = x^2 - 2x + 5$, where $f(x) = 5$



Solution(s): _____

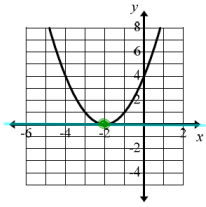
Verify:

5) Given each graph of $y = f(x)$, determine how many real solutions the equation $f(x) = 0$ would have and state those solutions.



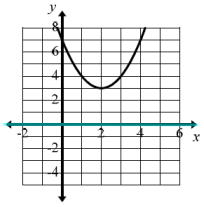
Number of real solutions: 2

Solutions: $x = -5$, $x = 1$



Number of real solutions: 1

Solutions: $x = -2$

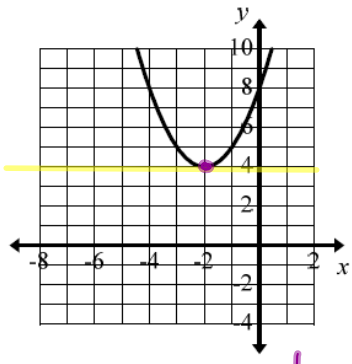


Number of real solutions: 0

Solutions: no real solutions

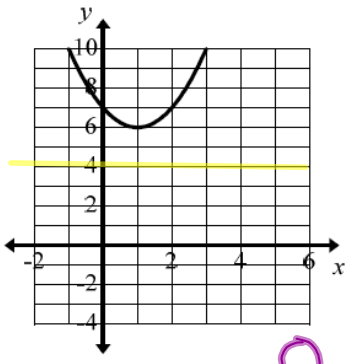
* lines don't intersect

6) Given each graph of $y = f(x)$, identify the number of real solutions for the equation $f(x) = 4$. Name the real solutions.



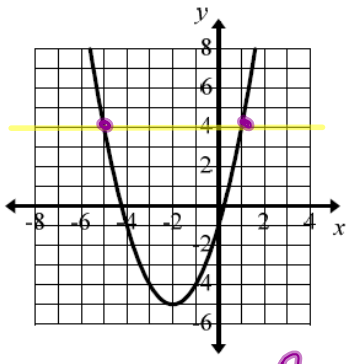
Number of real solutions: 1

Solutions: $x = -2$



Number of real solutions: 0

Solutions: no real solutions



Number of real solutions: 2

Solutions: $x = -5$, $x = 1$

HOMEWORK:

P-1

start with #9

#1,3-7,9

#8 for extra credit

#1 Zeros = Solutions = roots = X-intercepts