Algebra II

Name Answer Key

Chapter 2 Review- Non-Calculator

1. Given the parabola $y = x^2 + 2x - 15$, find:

   a. The equation of the parabola in graphing form

   $y = x^2+2x-15$ (+16 on both sides) $\rightarrow y+16 = x^2+2x+1 \rightarrow y+16 = (x+1)^2$

   $y = (x+1)^2 - 16$

   b. The vertex $(-1, -16)$

   c. The orientation

   Opens UP ($a>0$)

   d. The stretch factor 1

   e. The x-intercepts

   $0 = x^2+2x-15$

5	$5x$	-15
x	x^2	$-3x$
	x	-3

   $a=1$, $b=2$, $c=-15$

   2 #'s that have! sum of b (2) product of ac (-15)

   $\leftarrow$ 5 ; -3

   f. The y-intercept $(0, -15)$

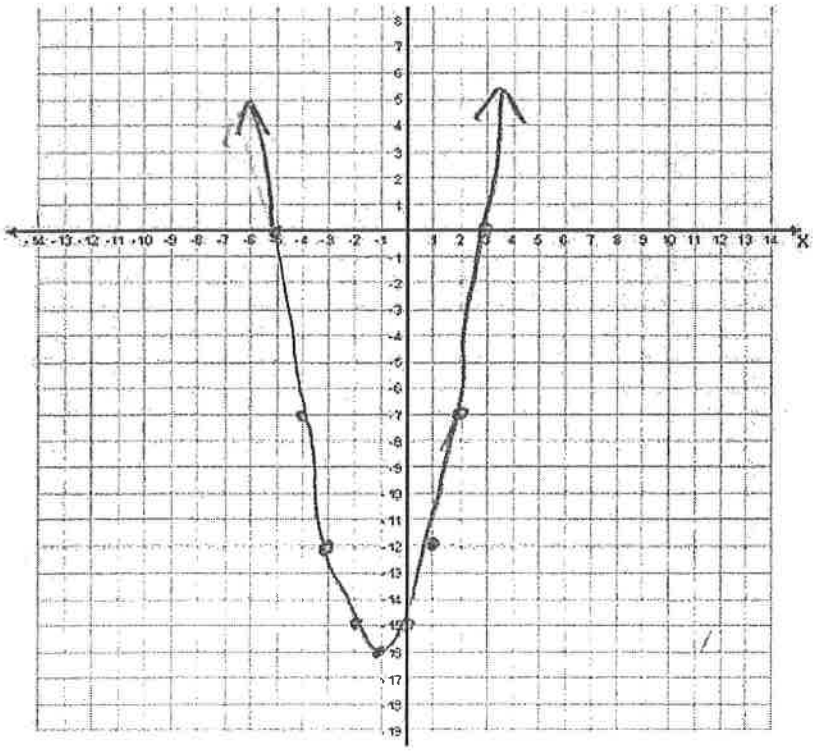
   So $0 = (x+5)(x-3)$

   $x = -5$; $x = 3$ are x-ints

   g. The equation of the line of symmetry

   $x = -1$

   h. A graph of the function



2. Given the parabola $y = -0.5(x-4)^2 + 2$, find:

a. The equation of the parabola in graphing form

Already in graphing form

b. The vertex

(4, 2)

c. The orientation

Opens DOWN

d. The stretch factor

$-\frac{1}{2}$

e. The x-intercepts

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

So $x=6$ & $x=2$ are x-ints.

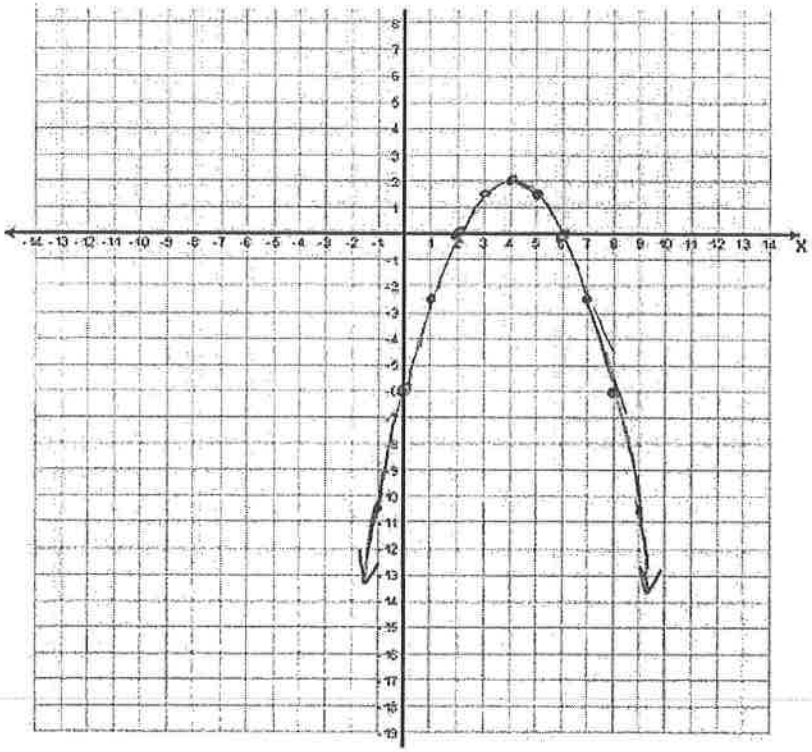
f. The y-intercept

$y = -\frac{1}{2}(0-4)^2 + 2 = -\frac{1}{2}(16) + 2 = -8 + 2 = -6$

g. The equation of the line of symmetry

$x = 4$

h. A graph of the function



3. Give the equation for the parabola below:

Vertex = (1, -3)

$y = a(x-1)^2 - 3$

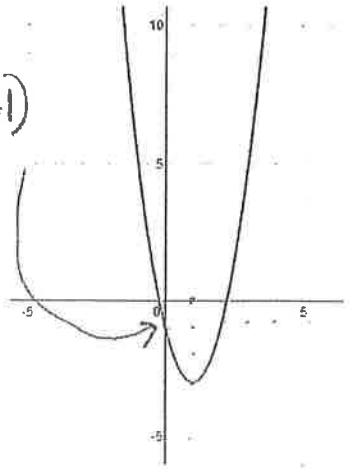
Point on graph = (0, -1)

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

$-1 = a - 3$

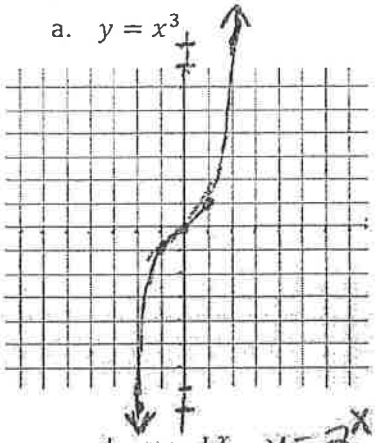
$2 = a$

$y = 2(x-1)^2 - 3$

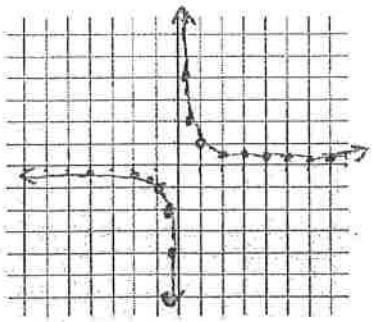


4. Graph each parent function:

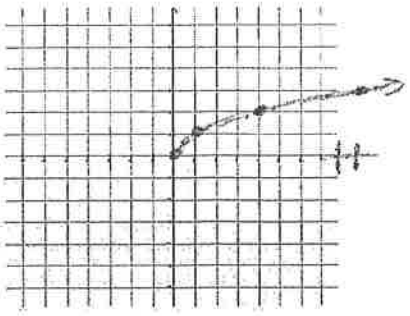
a. $y = x^3$



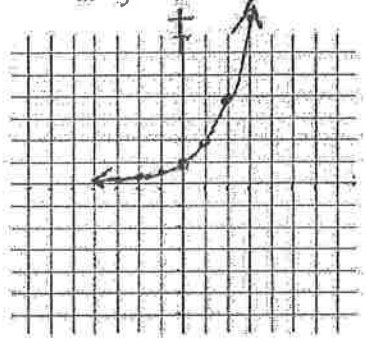
b. $y = \frac{1}{x}$



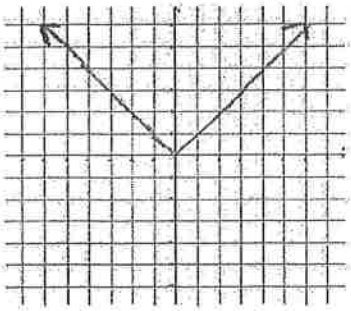
c. $y = \sqrt{x}$



d. $y = b^x$ $y = 2^x$



e. $y = |x|$



5. Which of the parent functions in #4 have a domain that is NOT "all real numbers"? What is the domain? (There can be more than one function).

B) $x \neq 0$ C) $x \geq 0$

6. Which of the parent functions in #4 have a range that is NOT "all real numbers"? What is the range? (There can be more than one function).

B) $y \neq 0$ C) $y \geq 0$ D) $y > 0$ E) $y \geq 0$

7. Which of the parent functions in #4 have asymptotes? What are the asymptotes? (There can be more than one function).

B) $x = 0$, $y = 0$ D) $y = 0$

8. Which of the parent functions in #4 have x-intercepts? What are the x-intercepts? (There can be more than one function).

A) (0,0) C) (0,0) E) (0,0)

9. Which of the parent functions in #4 have y-intercepts? What are the x-intercepts? (There can be more than one function).

A) (0,0) C) (0,0) D) (0,1) E) (0,0)

10. Write an equation for the function $y = \sqrt{x}$ after it has been moved 2 units left, 5 units down, and stretched vertically by a factor of 3.

$y = 3\sqrt{x+2} - 5$

11. Write an equation for the function $y = 2^x$ after it has been moved 3 units down and flipped upside down.

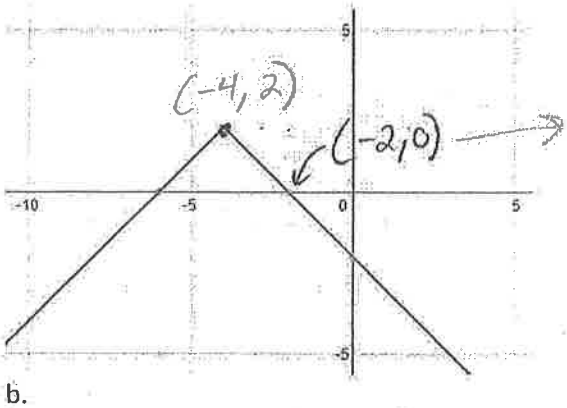
$y = -1 \cdot 2^x - 3$

12. Write an equation for the function $y = \frac{1}{x}$ after it has been moved 8 units right.

$y = \frac{1}{(x-8)}$

13. Give the equation for the graphs below:

a.



$y = a|x+4| + 2$

$0 = a|-2+4| + 2$

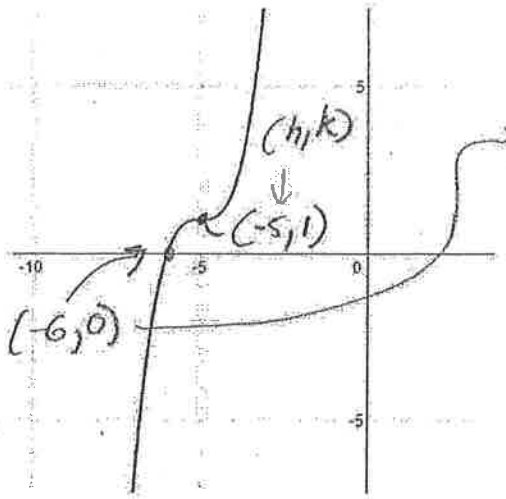
$0 = 2a + 2$

$-2 = 2a$

$-1 = a$

$y = -1|x+4| + 2$

b.



$y = a(x+5)^3 + 1$

$0 = a(-6+5)^3 + 1$

$0 = -a + 1$

$-1 = -a$

$1 = a$

$y = 1(x+5)^3 + 1$

14. Give the **explicit and recursive** formulas for the sequence 2, 7, 12, 17, 22, ...

n	0	1	2	3	4	5
t(n)	-3	2	7	12	17	22

$t(n) = 5n - 3$ ← Explicit

$t(n+1) = t(n) + 5$ ← Recursive

15. Give the **explicit and recursive** formulas for the sequence 81, 27, 9, 3, 1, ...

n	0	1	2	3	4	5
t(n)	243	81	27	9	3	1

$t(n) = 243 \cdot \left(\frac{1}{3}\right)^n$

$t(n+1) = t(n) \cdot \left(\frac{1}{3}\right)$

Algebra II
Chapter 2 Review – Calculator

Name Answer Key

1. Consider the following sequence: -5, -1, 3, ...

a. Is this sequence arithmetic or geometric? How can you tell?

arithmetic → adding 4 each time

b. Is 119 a term in this sequence? If so, what term number is it? If not, why not? Explain completely.

$t(n) = 4n - 9$ $\quad 119 = 4n - 9$ $\quad 128 = 4n$ $\quad 32 = n$

119 is a term because it is the $t(n)$ when n is 32. N has to be a positive integer, so 119 is a term in the sequence.

2. Consider the following sequence: 500, 100, 20, 4, ...

a. Is this sequence arithmetic or geometric? Why?

geometric → multiplying by $\frac{1}{5}$ each time

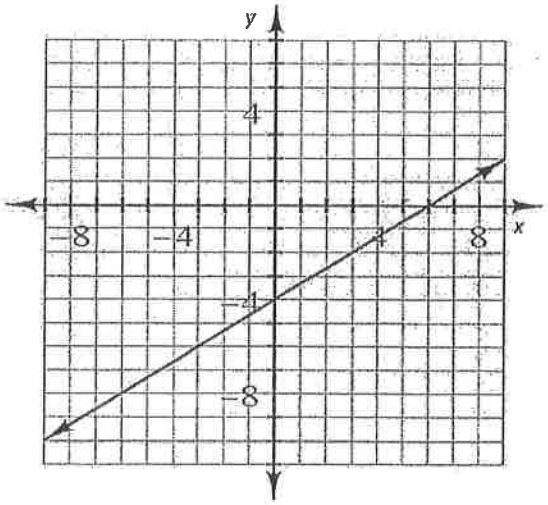
b. Give both an explicit and recursive equation for this sequence.

explicit → $t(n) = 2500 \cdot \left(\frac{1}{5}\right)^n$

recursive → $t(n+1) = t(n) \cdot \left(\frac{1}{5}\right)$

n	0	1	2	3	4
$t(n)$	2500	500	100	20	4

3. What is the equation for the graph at the right? Explain how you determined each number in your equation.



2 points → $(0, -4)$ $(6, 0)$

Slope = $\frac{-4-0}{0-6} = \frac{-4}{-6} = \frac{2}{3}$

y-int is $(0, -4)$

$y = \frac{2}{3}x - 4$

4. Find the error(s) in the solution at right. Explain what the error(s) is/are and show how to solve the equation correctly.

$(2x+5) - (5x+4) = 6 - 2(x-3)$

$2x + 5 - 5x + 4 = 6 - 2x - 6$

$-3x + 9 = -2x$

$9 = x$

Distributing the negative

$2x + 5 - 5x - 4 = 6 - 2x + 6$

$-3x + 1 = -2x + 12$

$-11 = x$

5. Multiply each of the following expressions. How can you check that each result is equivalent to the given expression? → Plug in a value in both the original & distributed expressions, you should get the same outcome.

a. $2w(w-3)$

$2w^2 - 6w$

b. $(2x-1)(x+7)$

$2x^2 - x + 14x - 7$

$2x^2 + 13x - 7$

c. $-3(x-4)(2x-5)$

$(-3x+12)(2x-5)$

$-6x^2 + 24x + 15x - 60$

$-6x^2 + 39x - 60$

d. $(p+3)(p^2+4p-5)$

	p^2	$4p$	-5
p	p^3	$4p^2$	$-5p$
3	$3p^2$	$12p$	-15

$p^3 + 7p^2 + 7p - 15$

6. Solve the system of equations at right and explain what the solution means in as many ways as you can.

$4x - y = -13$

$3x + 2y = 4$

$4x - y = -13$ $\quad 3x + 2y = 4$

$\times 2$ $\quad 8x - 2y = -26$

$+ (3x + 2y = 4)$

$11x = -22$

$x = -2$

$3(-2) + 2y = 4$

$-6 + 2y = 4$

$2y = 10$

$y = 5$

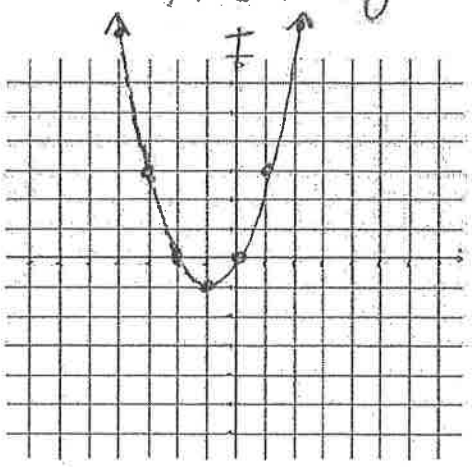
$(-2, 5)$ is the solution to the system.

$(-2, 5)$ is where the two lines cross

$(-2, 5)$ generates a true statement in both equations

7. Make a table and graph $f(x) = x^2 + 2x$.

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



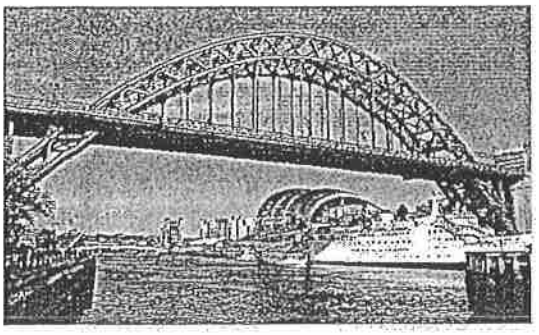
8. Is $(a+b)^2$ equivalent to $a^2 + b^2$? Why or why not? Justify your answer completely.

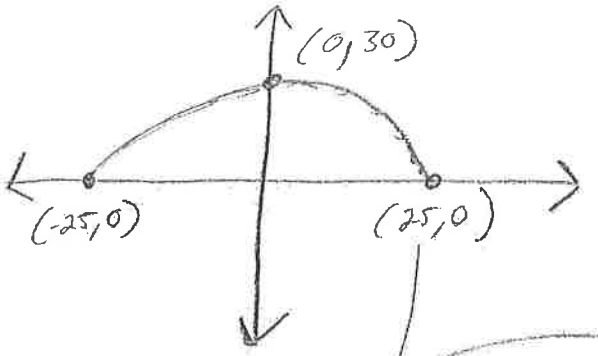
No.

$(a+b)^2 = (a+b)(a+b)$

$= a^2 + 2ab + b^2$

9. A parabolically arched bridge is constructed to span a river that is 50 feet wide. The highest point of the bridge is 30 feet above the road level. Find the equation of a parabola that could model this bridge.





$y = a(x-h)^2 + k$

$y = a(x-0)^2 + 30$

$0 = a(25-0)^2 + 30$

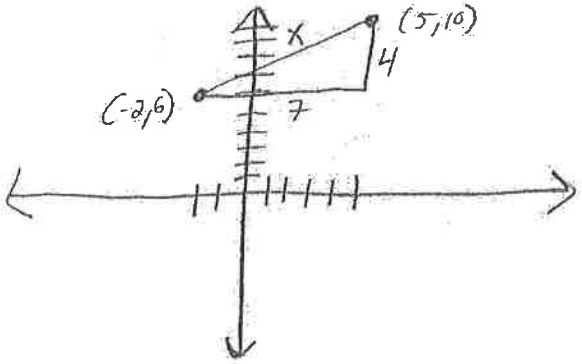
$0 = 625a + 30$

$-30 = 625a$

$a = \frac{-30}{625} = -\frac{6}{125}$

$y = -\frac{6}{125}(x-0)^2 + 30$

10. Find the distance between the points (-2, 6) and (5,10) on a coordinate plane.



$4^2 + 7^2 = x^2$

$65 = x^2$

$\sqrt{65} = x$

11. Mike Teavee's parents want him to spend more time playing outside and have developed a rewards system for him. Every time he rides his bike, he gets 5 points. Every time he plays a video game, he loses 3 points. A bike ride takes him 15 minutes and playing a video game takes him 20 minutes. If at the end of the week Mike has 35 points and either rode his bike or played a video game for a combined total of 395 minutes, how many bike rides did he go on and how many video games did he play?

B = # of Bike Rides

V = # of video game sessions

Points: $5B - 3V = 35$

Time: $15B + 20V = 395$

$3(5B - 3V = 35)$

$15B - 9V = 105$

$15B + 20V = 395$

$-(15B - 9V = 105)$

$29V = 290$

$V = 10$

$5B - 3(10) = 35$

$5B - 30 = 35$

$5B = 65$

$B = 13$

13 Bike Rides, 10 Video Game Sessions