

Assignment 1/10/19

TEST FRIDAY

Name _____

Date _____

Advanced Algebra

Unit 4: Quadratics

Review #4 for the Unit Test

Foundational (55%)

Solve the following for x.

1) $0 = 4(x+1)^2 - 16$

$4 = (x+1)^2$

$\pm 2 = x+1$

$x = -3$ or $x = 1$

$$\frac{-20 \pm \sqrt{111}}{10}$$

 9.1
 -13.1

2) $605 = 5x^2 + 20x + 10$

$5x^2 + 20x + -595 = 0$

$$\frac{-20 \pm \sqrt{20^2 - 4(5)(-595)}}{10}$$

3) $-19(2x-5)(7x+9) = 0$

$2x-5=0$
 $x = \frac{5}{2}$

$7x+9=0$
 $x = -\frac{9}{7}$
 $x = -1.3$

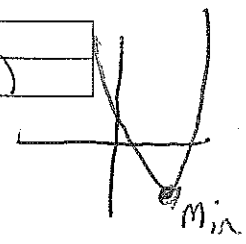
Analyze each of the quadratic equations below and identify the key points:

4) $A(x) = 5(x-2)^2 - 3$ $\frac{3}{5} = (x-2)^2$ $\pm 0.77 = x-2$

Root 1	Root 2	Vertex	Y- intercept
2.77	1.23	(2, -3)	(0, 17)

The domain of A(x) is: All Real #'s

The range of A(x) is: $y \geq -3$

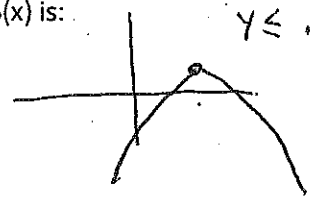


5) $B(x) = -3(x-4)(x-3)$

Root 1	Root 2	Vertex	Y- intercept
4	3	(3.5, 0.75)	(0, -36)

The domain of B(x) is: All Real

The range of B(x) is: $y \leq 0.75$



6) $C(x) = x^2 - 4x + 6$ $(x^2 - 4x + 4) - 4 + 6$ $\pm 1.41 = x-2$
 $y = (x-2)^2 + 2$

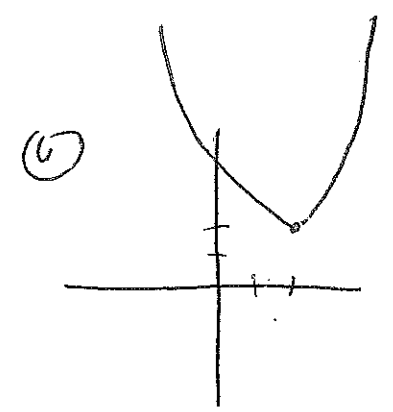
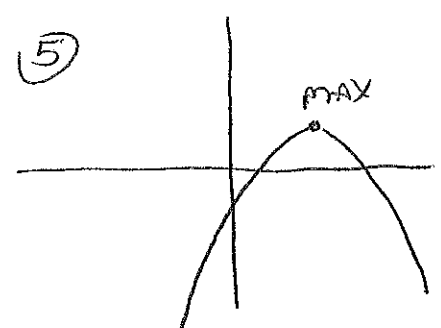
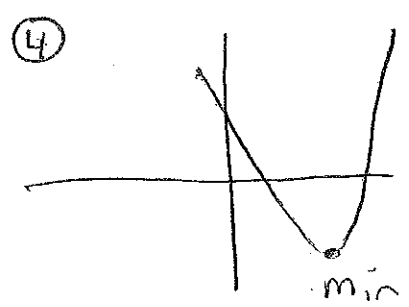
$2 \pm 1.41i$

Root 1	Root 2	Vertex	Y- intercept
No Real	No Real	(2, 2)	0, 6

The domain of C(x) is: All Real

The range of C(x) is: $y \geq 2$

Sketch the graph of each of the parabolas above (4-6)



7) Solve for the roots of $x^2+10x+41=0$

$$\frac{-10 \pm \sqrt{100 - 4(1)(41)}}{2}$$

$$\frac{-10 \pm \sqrt{-64}}{2}$$

$$\frac{-10 \pm 8i}{2}$$

$$\boxed{-5 \pm 4i}$$

8) Rewrite $3x^2+12x-5$ in factored and in vertex form.

$$(3x + \dots)(x + 5)$$

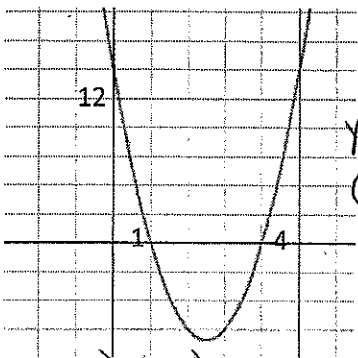
Vertex form final answer

$$3(x+2)^2 - 17$$

Factored form final answer

$$3(x - .3833)(x + 4.3833)$$

For each of the following graphs, write the equation of the parabola in the form $y=ax^2+bx+c$



$$y = a(x-1)(x-4)$$

$$(0, 12)$$

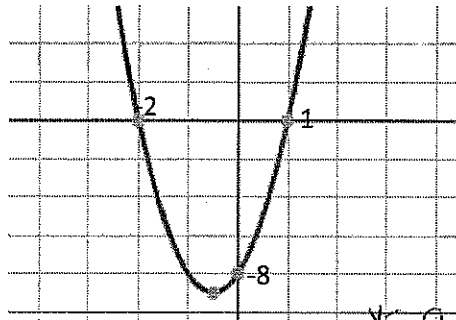
$$12 = a(0-1)(0-4)$$

$$12 = 4a$$

$$a = 3$$

$$y = 3(x-1)(x-4)$$

$$y = 3(x^2 - 5x + 4) = \boxed{3x^2 - 15x + 12}$$



$$y = a(x+2)(x-1)$$

$$y = a(x+2)(x-1)$$

$$(0, -8)$$

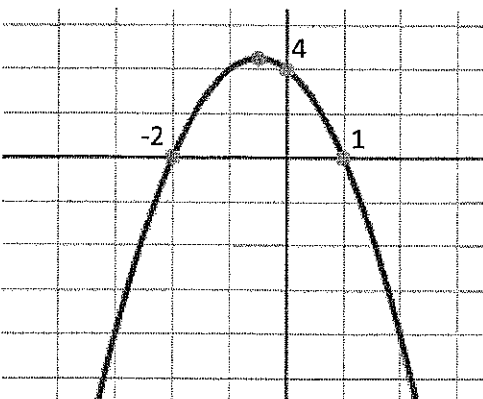
$$-8 = a(0+2)(0-1)$$

$$-8 = -2a$$

$$\boxed{a = 4}$$

$$y = 4(x^2 + x - 2)$$

$$\boxed{4x^2 + 4x - 8}$$



$$y = a(x+2)(x-1)$$

$$(0, 4)$$

$$4 = a(0+2)(0-1)$$

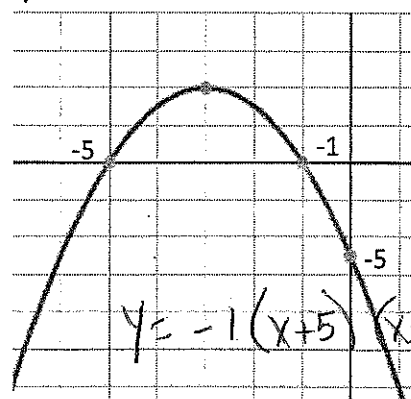
$$4 = -2a$$

$$a = -2$$

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

$$-2(x^2 + x - 2)$$

$$\boxed{-2x^2 - 2x + 4}$$



$$y = -1(x+5)(x+1)$$

$$-1(x^2 + 6x + 5)$$

$$\boxed{-x^2 - 6x - 5}$$

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

$$(0, -5)$$

$$-5 = a(0+5)(0+1)$$

$$-5 = 5a$$

$$\frac{-12}{6} =$$

$$-2$$

$$\text{VARs}(-2) = -17$$

$$-12 \pm \sqrt{12^2 - 4(3)(-5)}$$

$$\frac{-12 \pm 14.3}{6} = .3833$$

$$-4.3833$$

9) The curve $y=a(x+b)^2 + c$ has a minimum point at (3,6) and passes through the point (1,14).

a) Write the equation of this parabola

$$y = a(x-3)^2 + 6 \quad (1,14)$$

$$14 = a(1-3)^2 + 6$$

$$8 = 4a \quad \boxed{a=2}$$

$$y = 2(x-3)^2 + 6$$

b) Write down the values of b and c

Final answer for b
 -12

Final answer for c
 24

$$2(x^2 - 6x + 9) + 6$$

$$2x^2 - 12x + 18 + 6$$

$$2x^2 - 12x + 24$$

Moderate (36%)

10) An object is launched from the ground directly upward at 39.2m/s which produces the following equation: $h(t) = -4.9t^2 + 39.2t$ where $h(t)$ is the height in meters after t seconds.

a) What is the height of the object after 1 second?

$$h(1) = -4.9(1)^2 + 39.2(1) \quad \boxed{34.3 \text{ meters}}$$

I can always write

$$\boxed{-4.9t^2 + 39.2t + 0}$$

a b c

b) When will the object hit the ground?

8 seconds

$$\frac{-39.2 \pm \sqrt{39.2^2 - 4(-4.9)(0)}}{2}$$

$$\frac{-39.2 \pm 39.2}{2(-4.9)} < 0$$

8

c) What is the maximum height reached?

$$\frac{-39.2}{-9.8} \quad (4, 78.4)$$

d) For how long is the object at or above a height of 34.3 meters?

6 Total seconds

$$34.3 = -4.9t^2 + 39.2t$$

$$0 = -4.9t^2 + 39.2t - 34.3$$

$$\frac{-39.2 \pm \sqrt{39.2^2 - 4(-4.9)(-34.3)}}{-9.8}$$

11) Find the sum and the product of $(4+3i)$ and $(4-3i)$

Sum
 8

Product
 25

$$\frac{-39.2 \pm 29.4}{-9.8}$$

$$\boxed{\text{sec or } 7}$$

$16 - 9i^2$
 $16 + 9$
 $-b = \text{sum of Roots}$
 $c = \text{product}$

so

$$-b = 8$$

$$c = -8$$

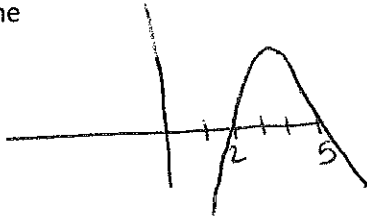
$$\boxed{x^2 - 8x + 25}$$

12) Remembering that $-b =$ sum of the roots and $c =$ the product of the roots, write the equation of the parabola that produced the roots in problem #11

$$x^2 - 8x + 25$$

The football team is having a water balloon contest to raise money. A student releases a balloon from the 2 yard line. It reaches a max height of 5 yards and lands at the 8 yard line.

13) Draw a sketch of the water balloon scenario. Showing the path leading the 2 yard line and landing on the 5 yard line



14) Write a quadratic equation that represents the balloon's vertical height (y) with respect to its horizontal distance (x). Don't forget to find the "a" value for your equation to be totally correct.

$$y = (x-2)(x-8)$$

$$y = -1.55(x-2)(x-8)$$

$$y = a(x-2)(x-8)$$

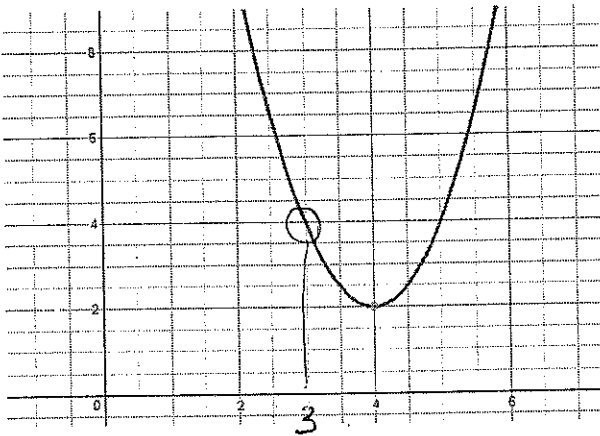
$$5 = a(5-2)(5-8)$$

$$\frac{5+2}{2} = 3.5$$

$$(3.5, 5)$$

High Challenge (9%)

15) Write the equations that correspond to the graph shown.



$$y = a(x-4)^2 + 2$$

$$4 = a(3-4)^2 + 2$$

$$2 = a$$

point 3, 4

$$2(x^2 - 8x + 16)$$

$$2x^2 - 16x + 32 + 2$$

Vertex form	$y = 2(x-4)^2 + 2$
General Form	$y = 2x^2 - 16x + 34$
Factored Form	$x = 4 + 2 \quad x = 4 - 2$

16) The roots of a quadratic are $x=3+i$ and $x=3-i$. What is the equation of the quadratic in general form?

$$-b = 6$$

$$b = -6$$

$$9 - c$$

$$9 - 1$$

$$(10)$$

$$y = x^2 - 6x + 10$$

$$16 \pm \sqrt{16 - 4(2)(34)}$$

$$\frac{16 \pm \sqrt{-16}}{4}$$

$$4 \pm i$$