

Advanced Algebra

Review #3 for Unit 4 Quadratics Test 2023 Assignment #24

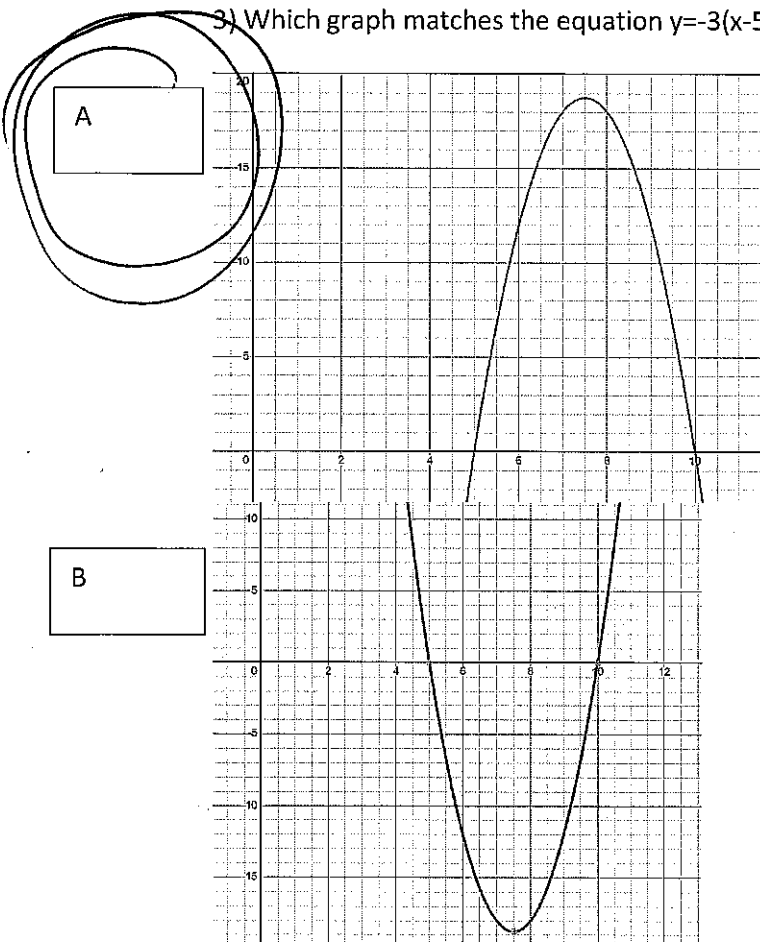
1. Which of the following expressions is equivalent to $12x^2 - 4x - 8$

A	B	C	D
$(4x + 1)(x - 5)$	$(4x - 4)(3x - 5)$	$(4x - 4)(3x + 2)$	$(4x - 5)(x + 1)$

2. Which of the following is equivalent to $6x^2 - 8x + 12$?

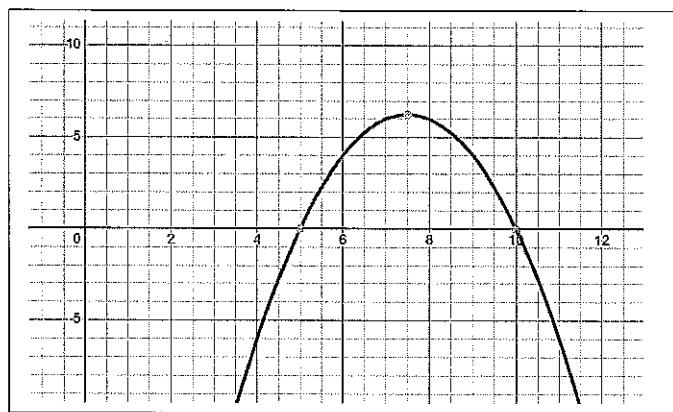
A	B	C	D
$6\left(x - \frac{8}{12}\right)^2 + 9.33$	$6\left(x - \frac{8}{12}\right)^2 + 7$	$6(x + 1.5)^2 + 0$	$6(x + 1.5)^2 - 2$

3. Which graph matches the equation $y = -3(x-5)(x-10)$



Roots
5 and 10
(7.5, 18.75)

C



3. Find all the key points for the equation: $f(x) = \frac{3}{4}x^2 - 8x + 4$

$$8 \pm \frac{\sqrt{64 - 4\left(\frac{3}{4}\right)(4)}}{\frac{6}{4}}$$

$$8 \pm \frac{\sqrt{52}}{\frac{6}{4}} \rightarrow 10.5$$

a. Key points

Root 1	Root 2	Vertex	Y-intercept
10.14	.53	(5.335, -17.33)	(0, 4)

$$\frac{10.14 + .53}{2} = 5.335, \quad -17.33$$

b. The vertex of $f(x)$ is a Maxima or Minima (Circle one)

c. The equation of $f(x)$ written in vertex form is

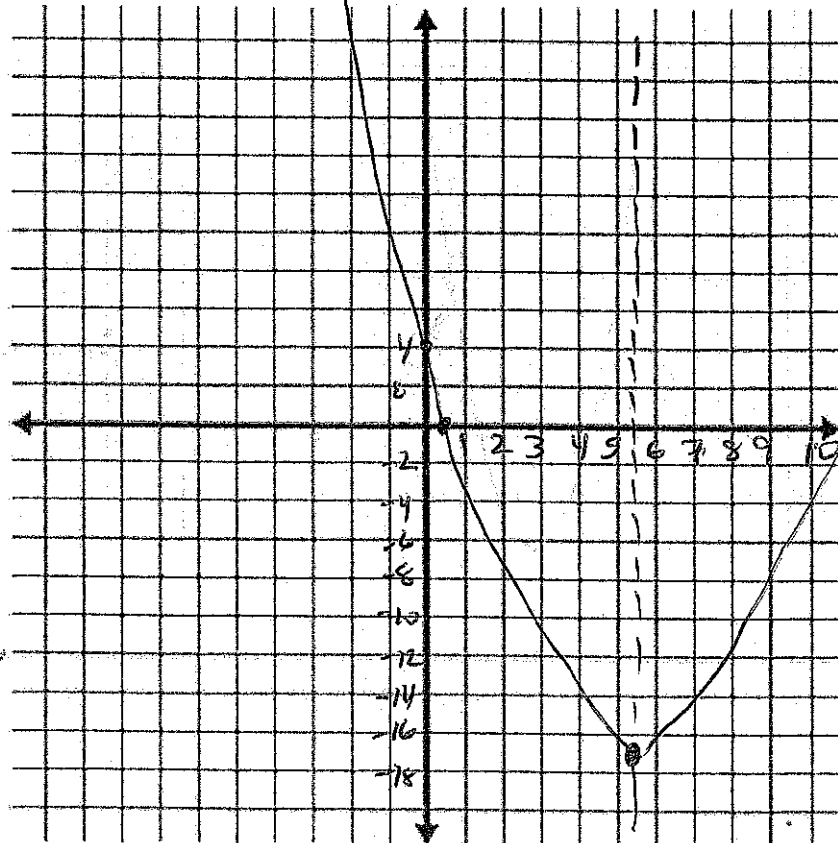
Quadratic formula is as follows:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Write vertex form here:

$$y = \frac{3}{4}(x - 5.335)^2 - 17.33$$

d. Graph this equation, label all the key points in your graph.



4) Given $y=2x^2+5x+8$

What are the roots?

$$\frac{-5 \pm \sqrt{25 - 4(2)(8)}}{4}$$

$$\frac{-5 \pm \sqrt{-39}}{4}$$

$$\frac{-5 \pm 6.24i}{4}$$

What is the vertex?

$$\frac{-5}{4} \quad (-1.25, 4.875)$$

5) Given the roots of a parabola are $(10+2i)$ and $(10-2i)$

a) Find the sum of the given roots

$$20$$

b) Find the product of the given roots

$$100 + 4 \\ 104$$

	10	2i
10	100	20i
-2i	-20i	4i ²

c) Remembering that $-b =$ sum of the roots and c is the product, what is the quadratic equation from which this came?

$$-b = 20$$

$$b = -20$$

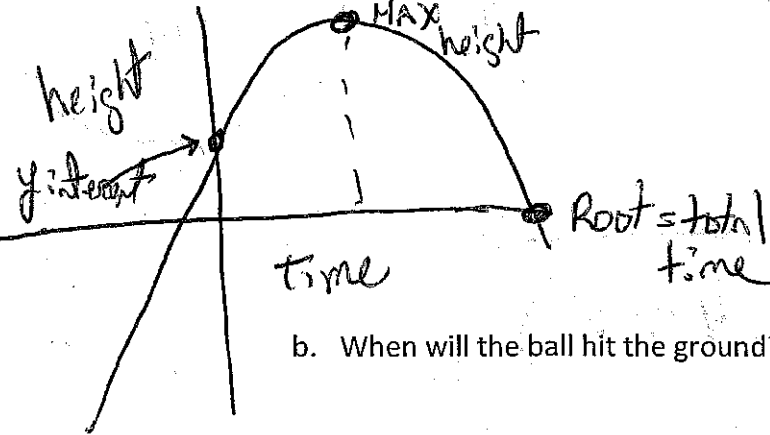
$$c = 104$$

$$y = x^2 - 20x + 104$$

6) The height of a baseball thrown into the air can be represented by the following equation:

$h(t) = -4.9t^2 + 45t + 32$, where $h(t)$ is the height of the ball in meters after t seconds.

a. Find $h(t)$ when $t = 0$ and give the real-world meaning for this value.



$$h(0) = 32$$

This is the starting height of the baseball.

b. When will the ball hit the ground? SHOW YOUR WORK

Quadratic Formula:

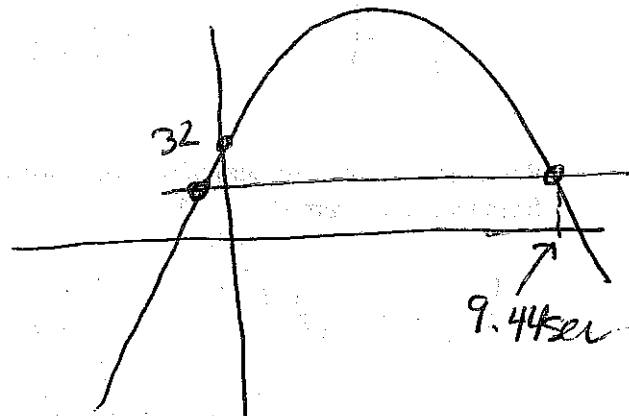
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Final answer here:

9.8 seconds

$$\frac{-45 \pm \sqrt{45^2 - 4(-4.9)(32)}}{-9.8} \begin{matrix} -0.663 \\ 9.8 \end{matrix}$$

c. After how many seconds is the ball 20 meters above the ground? SHOW YOUR WORK



Final answer here:

9.44 second

$$\begin{aligned} -4.9t^2 + 45t + 32 &= 20 \\ -4.9t^2 + 45t + 12 &= 0 \\ -4.5 \pm \sqrt{4.5^2 - 4(-4.9)(12)} & \quad -4.5 \pm 47.5 \\ -9.8 & \quad -9.8 \end{aligned}$$

7) The parabola cuts the x axis at 1 and 2. It passes through a given point of (0,4). Write the equation.

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

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

$$4 = 2a$$

$$a = 2$$

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

8) The parabola touches the x axis at 1. It passes through a given point of (0,-3). Write the equation.

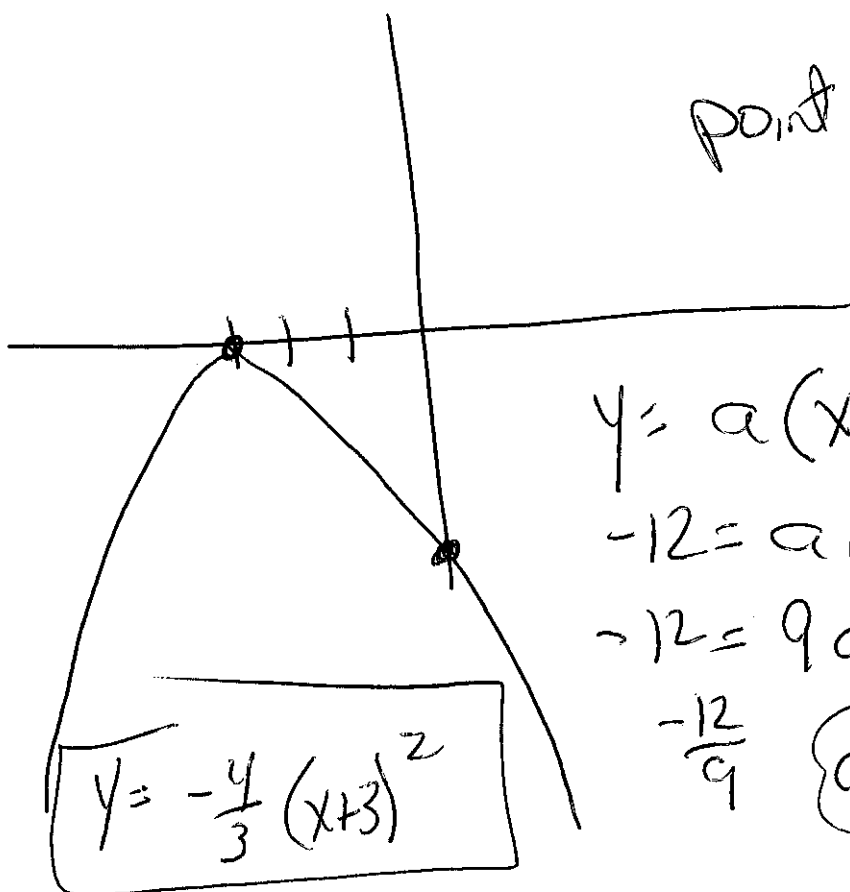
$$y = a(x-1)^2 + 0$$

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

$$-3 = a$$

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

9) The parabola touches the x axis at -3 and cuts the y axis at -12. Write the equation of the parabola.



point is (0, -12)

$$y = a(x+3)^2 + 0$$

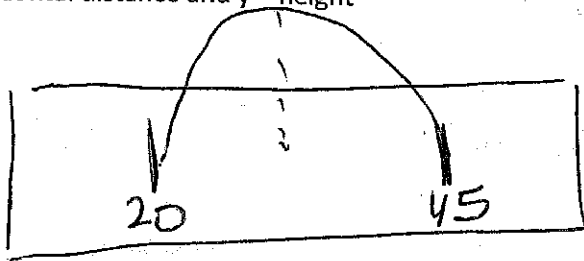
$$-12 = a(3)^2$$

$$-12 = 9a$$

$$-\frac{12}{9} \quad \{ a = -\frac{4}{3} \}$$

y coordinate of vertex

10) The band releases a balloon at the 20 yard line. It reaches a maximum height of 75 feet. It lands on the 45 yard line. Write the equation to model horizontal distance of the balloon vs height of the balloon. Let x = horizontal distance and y = height



$$y = a(x - 20)(x - 45)$$

$$(32.5, 75)$$

$$75 = a(32.5 - 20)(32.5 - 45)$$

$$75 = -156.25a$$

$$-0.48 = a$$

$$y = -0.48(x - 20)(x - 45)$$

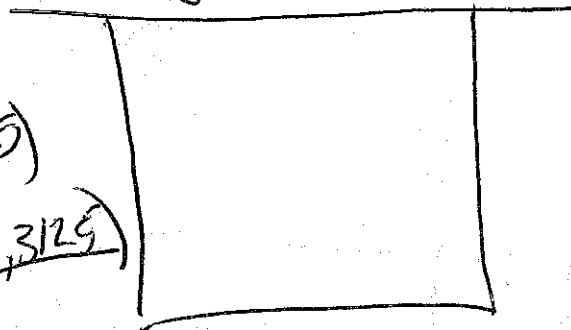
$$\frac{20 + 45}{2}$$

$$32.5$$

x coordinate of vertex

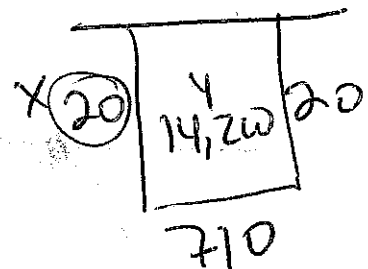
11) You have 750 feet of fence to work with. You will be building a 3 sided rectangular fence because you will be using the side of a barn as one side of the fence. Show how to maximize the area of the fence given the fixed perimeter.

Wall



$$y = -2(x - 0)(x - 375)$$

vertex $(187.5, 70,312.5)$



$$y = a(x - 0)(x - 375)$$

my point $(20, 14,200)$

$$14,200 = a(20 - 0)(20 - 375)$$

$$14,200 = -7100a$$

$$a = -2$$

MAX AREA

$$70,312.5 \text{ ft}^2$$