IAG 2 - Holleran
Unit 2: Quadratics Pt 2
Test/Quiz Tab

Name: Answer

Score: _____ / _____

Unit 2 Test Review

This unit test covers Inv. 8-12. Please look over HW Packet 5, Inv. 8-12, Quiz 2, "Parabolas and Quadratic Functions-Practice Set," "Solving Quadratic Functions: Can You Choose the Right Strategy?," and "Nonlinear System: Linear and Inverse Variation Extra Practice" as well as any notes.

1. Solve each of the following equations using algebra, then provide a small sketch of the graphs in the system and label all solutions on the graph.

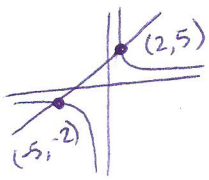
a.) $x + 3 = \frac{10}{x}$

$x^2+3x=10$

$x^2+3x-10=0$

$(x+5)(x-2)=0$

$x=-5,\ x=2$

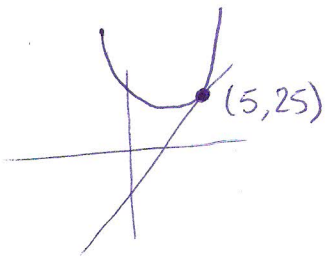


b.) $6x - 5 = x^2 - 4x + 20$

$0 = x^2-10x+25$

$=(x-5)(x-5)$

$x=5$



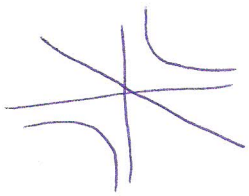
c.) $-4x = \frac{24}{x}$

$-4x^2=24$

$x^2=-6$

$x=\sqrt{-6}$

No Solution!



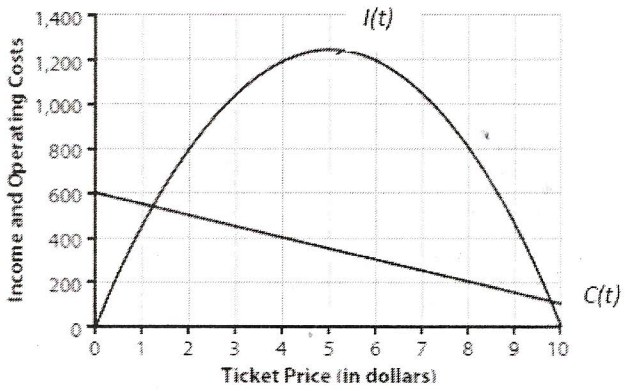
2. Explain all of the different solution possibilities for a system of equations involving one linear equation and one quadratic equation. Sketches may help but are *not* enough of an explanation (you should discuss points of intersection, etc.)

The line can intersect a parabola twice, once, or not at all. Thus, there can be 2, 1, or no solution.

3. Each year, the combined high school orchestras in Muse City stages a public concert. Based on data from previous years, the organizers decided that the income and operating costs can be represented as functions of ticket price according to the following equations and graph:

Income from ticket sales $I(t)$ is related to ticket price t by the equation $I(t) = 500t - 50t^2$.

Cost $C(t)$ of operating the concert is related to ticket price t by the equation $C(t) = 600 - 50t$.



a.) What ticket price(s) would generate the greatest income? What is the greatest income? Explain how you obtained your answer:

Ticket Price(s) = $5 Greatest Income = $1250

b.) For what ticket price(s) would the operating costs be equal to the income from ticket sales? Explain how you obtained your answer.

$t = \$1.25, \$9.75$

[exact answers: 1.23 and 9.77]

c.) For what ticket prices would the operating costs be less than the income from ticket sales?

Between $1.25 and $9.75 or $1.25 < t < 9.75$

d.) Which of the following rules gives the predicted profit *P(t)* as a function of ticket price?

I. $P(t) = -50t^2 + 550t - 600$

II. $P(t) = 50t^2 - 550t + 600$

III. $P(t) = -50t^2 - 450t + 600$

P = Income - Cost

$= (500t - 50t^2) - (600 - 50t)$

$= 500t - 50t^2 - 600 + 50t$

$= -50t^2 + 550t - 600$

4. Using the indicated method, solve the following equations:

$$3x + 25 = 2x^2 + 14x - 15$$

a.) Using the quadratic formula:

$0 = 2x^2 + 11x - 40$

$A = 2$
$B = 11$
$C = -40$

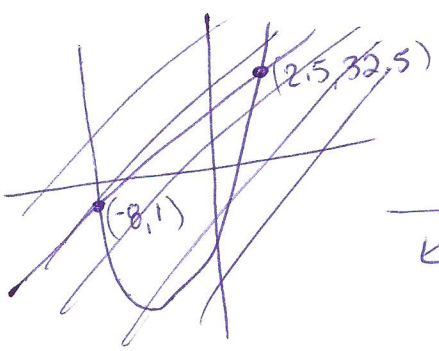
$$x = \frac{-11}{2(2)} \pm \frac{\sqrt{11^2 - 4(2)(-40)}}{2(2)}$$

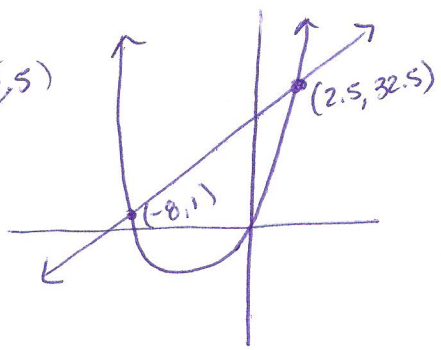
$x = -2.75 \pm 5.25$

$x = 2.5$ and $x = -8$

b.) Using a table (under Tblset, ΔTbl=0.5) and a graph. Include a sketch of the table and graph below showing the solution(s):

X	Y_1	Y_2	
-8	1	1	*
-7.5	2.5	-7.5	
-7	4	-15	
⋮			
2	31	21	
2.5	32.5	32.5	*





5. Write these products in equivalent $ax^2 + bx + c$ form

a.) $(x-7)(x+8)$

$x^2+8x-7x-56$

x^2+x-56

b.) $(x-9)(x-9)$

$x^2-18x+81$

c.) $(2x+7)^2$

$4x^2+14x+14x+49$

$4x^2+28x+49$

d.) $(5x-3)(5x+3)$

$25x^2-9$

6. Solve these quadratic equations by using **SQUARE ROOTS, FACTORING**, or the **QUADRATIC FORMULA.** There may be no solution. Round all decimal answers to the tenths place.

a.) $x^2 - 15x + 50 = 0$

$x=10$

$x=5$

b.) $x^2 - 9x + 20 = 20$

$x=9$

$x=0$

$x^2-9x=0$

$x(x-9)=0$

c.) $2x^2 - 10x = 0$

$2x(x-5)=0$

$x=0$

$x=5$

d.) $5 - x^2 = -479$

$x^2=484$

$x=\pm 22$

e.) $x^2 - 15x = 9 - 15x$

$x^2 = 9$

$x = \pm 3$

f.) $-x^2 + 16x - 8 = 0$

$x \approx 0.52$

$x \approx 15.5$

7. Without the use of your graphing calculator, find the coordinates of the x-intercepts, y-intercept, and vertex points for the graphs of the following quadratic functions.

a.) $f(x) = (x - 3)(x - 8)$

x-int: (3,0) (8,0)

yint: (0,24)

vertex: (~~5~~, (5.5, -6.25)

b.) $f(x) = -(x - 3)(x + 5)$

x-int: (3,0)(-5,0)

y-int: (0,15)

vertex: (-1,16)

8. Write a quadratic function in the form $f(x) = a(x - m)(x - n)$ that has a graph with x-intercepts at (-2, 0) and (6, 0) with y-intercept at (0, -60).

x f(x)

$f(x) = a(x+2)(x-6)$

$-60 = a(0+2)(0-6)$

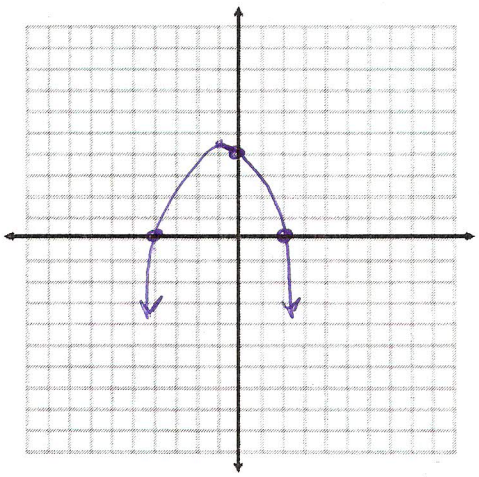
$-60 = a(2)(-6)$

$\frac{-60}{-12} = \frac{-12a}{-12}$

$a = 5$ → $f(x) = 5(x+2)(x-6)$

9. Sketch each of the graphs by finding, plotting and labeling the x-intercepts, y-intercept, and vertex point.

a. $f(x) = -\frac{1}{2}(x - 2)(x + 4)$



x-intercepts: (2 , 0) (-4 , 0)

y-intercept: (0, 4)

vertex: (-1 , 4.5)

$x = \frac{2 + -4}{2} = -1$

$y = -\frac{1}{2}(-1-2)(-1+4)$

$= 4.5$