Mth 95 **Exam 2** ***Franz Helfenstein*** **Name**

You must show the solution process not merely the answer to receive full credit. Write in a neat and organized fashion. Circle or box-in your answers. 100 pts.

1) Much of mathematics requires finding the equation of a line. Outline a procedure for finding the equation of a line through the two points (x_1, y_1) & (x_2, y_2). (3 pts)

2) Find the equation of the line connecting (-12, 15) & (6, 9) (5 pts)

Solving the Following Equations- *Show your work, check your answers where possible.* (5 pts ea)

3) Solve for x: $10 + 3(2x + 5) = 7x + 25$

4) Solve for y: $ax + by = cy + 5$

5) Solve for y: $\frac{3y + 5x}{4} = \frac{4x}{3} + 2y + 1$

6) Solve for x: $2(3x - 4) = 10 - 3(1 - 2x)$

7) Solve for x: $\frac{2}{3} = 4 - \frac{3(2x - 5)}{2}$

8) Solve for x: $5x(2x - 3) = 14(1 - 4x)$

9) Solve for x: $x(3x + 5) = 2(3x + 1) - 2x$

10) Use the Quadratic Formula to solve for y: $4x^2 = 3xy + 2y^2$

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

11) Consider $y = 0.04x^2 + 0.25x - 11$. Find all critical points to the hundredths place. (4 pts)

$root_1$	$root_2$	y-int	vertex

12) Find all intersections of $y = 0.2x^2 - 6$ & $y = 12 - 0.6x$ (4 pts)

13) t = year of an oil field's production with 2000 = 0. P = production in KL/day. (2 pts ea)

	year (t)	2001	2002	2005	2007
	KL/day (P)	47	60	90	98

(a) Place x or y in column 1 to indicate independent vs. dependent variable.

(b) Use Quadratic Regression to find the appropriate relationship. Write it here.

(c) According to your equation, when did the Oil field go into production?

(d) According to your equation, how long will production last?

(e) According to your equation, in which year, will production be at a maximum?

(f) According to your equation, in which year will production drop to 50 KL/day?

(g) According to your equation, what production is expected in 2010?

14) Karl sells Blazer posters at the Rose Garden for $5 ea. He obtains them for $1.75 ea. He also had to pay $135 for a vendor license. Let x = # of posters. (2 pts ea)

(a) Write a linear equation for Karl's Expenses.

(b) Write a linear equation for Karl's Revenues.

(c) Write a linear equation for Karl's Profits.

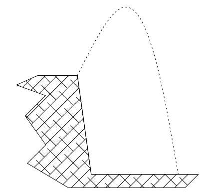
(d) How many posters must Karl sell to breakeven?

(e) If Karl buys and sells 100 posters what is his profit?

(f) If Karl wants to make $1000, how many posters must he buy and sell?

15) $H = -16t^2 + v_0t + h_0$ is called the Falling Body Equation and gives the height (H-ft) of an object that is thrown upward with an initial velocity v_0 (ft/sec) from an initial height h_0 (ft).

Suppose an arrow is shot upward from a 500' high cliff. The initial velocity of the arrow is 600 ft/sec. (3 pts ea)



(a) How high will the arrow get relative to the cliff base?

(b) How many seconds will the arrow be in flight?

16) Fill in the blank(s). (2 pts ea)

(a) An equation of the form $\underline{ax + b = cx + d}$ is called a ____________________ equation.

(b) An equation of the form $\underline{ax^2 + bx + c = 0}$ is called a ____________________ equation.

17) True/False. Circle 'T' if the statement is ALWAYS true. Otherwise circle 'F'. These questions refer to quadratic equations and functions. (1 pts ea)

(a)	T	F	All quadratic functions cross the x-axis.
(b)	T	F	All quadratic functions cross the y-axis.
(c)	T	F	If $b^2 - 4ac = 0$, the vertex will coincide with the root(s).
(d)	T	F	The vertex is always located half-way between the roots.
(e)	T	F	If $b^2 - 4ac > 0$, there can be only one real root.
(f)	T	F	The x-value of the vertex is always located at $x = -b/(2a)$
(g)	T	F	$y = a(x + p)(x - q)$; $a, p, q > 0$ has roots at p & q.
(h)	T	F	$y = a(x - h)^2 + k$; $a, h, k > 0$ has a vertex at (h, k)

BONUS

Name the Group, the Lead Singer, and the Name of the Song with the lyrics …*meet the new boss, same as the old boss*…

The solution to $ax^3 + bx^2 + cx + d = 0$ is $x = \{q + [q^2 + (r-p^2)^3]^{1/2}\}^{1/3} + \{q - [q^2 + (r-p^2)^3]^{1/2}\}^{1/3} + p$

where $p = -b/(3a)$, $q = p^3 + (bc-3ad)/(6a^2)$, $r = c/(3a)$

Use the cubic formula to find x for $x^3 + 4x^2 + x - 6 = 0$