HOMEWORK 4 - MATH 111
DUE DATE: Wednesday, October 19
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Study (find vertex, opening direction, intercepts and roughly sketch the graph) the parabolas:

    (a) $f(x) = x^2 + 2x - 15$

    (b) $f(x) = -2x^2 + 2$

2. Find the formulas of the following parabolas:

    (a) The vertex is at $(-2, 4)$ and the y-intercept is -1;

    (b) The vertex is at $(5, -7)$ and it passes through the point $(-1, 12)$.

3. Solve the following quadratic equations:

    (a) $x^2 - 7x = -10$

    (b) $2x^2 - 13x + 15 = 0$

    (c) $2x^2 - 6x + 17 = 0$

4. Señor Jorge wants to start a llama farm and for that he must build a pen for the llamas. He wants a square pen because that gives the most area per meter of fence. He can buy the land for the pen at a cost of $1.00 per square meter and the fence around the pen will cost $5 per meter to purchase and construct. Señor Jorge has a budget of $20,000 for the land and fence. How large a pen can he get with that budget?

5. Solve the following quadratic inequalities:

    (a) $x^2 + 16 \geq 10x$

    (b) $x^5 < 5x$

6. Solve the following equations:

    (a) $\sqrt{x}(1 - \sqrt{x}) = -2$

    (b) $\frac{5}{x} + \frac{6}{x+2} = 1$

    (c) $\sqrt{x^2 + 1} + x = 5$

7. The difference between two numbers is 3 and their product is 40. What are the two numbers? (Do *not* guess! Show all your work!)

8. Pat and Mike are painting five rooms in a house. On his own, Pat would take 10 hours longer than Mike. Together they can paint the rooms in 20 hours. How long would it take Mike on his own to paint all five rooms?