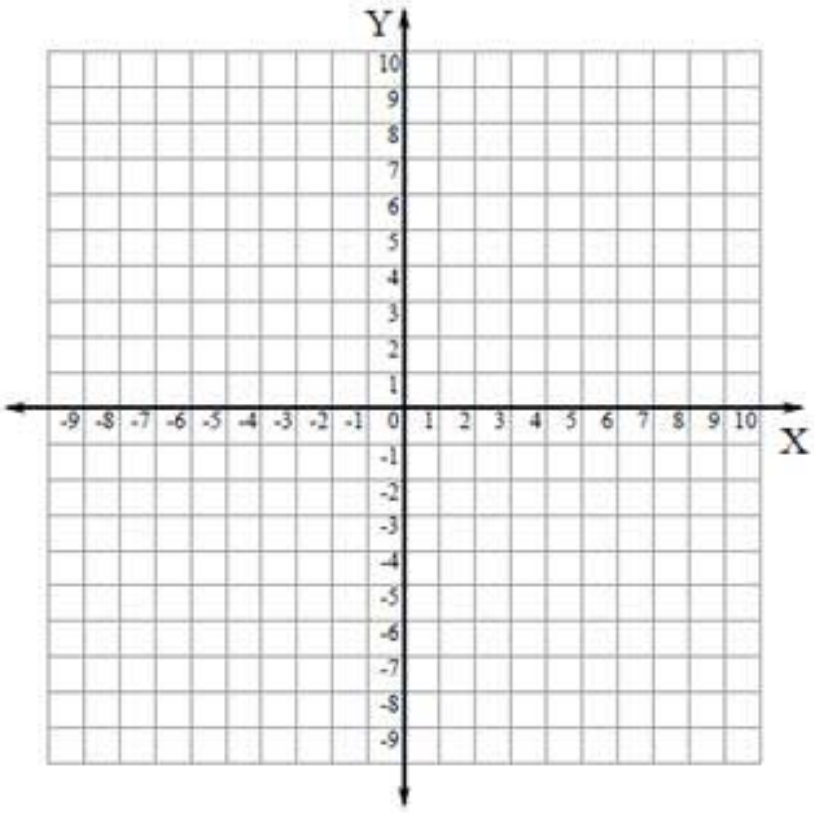
Math 139
Burger

Midterm 1 Study Problems

1. Graph and shade the solution set for the following system of inequalities:

$$x + y < 2$$
$$y \geq 2(2 - x)$$
$$x \leq 2$$



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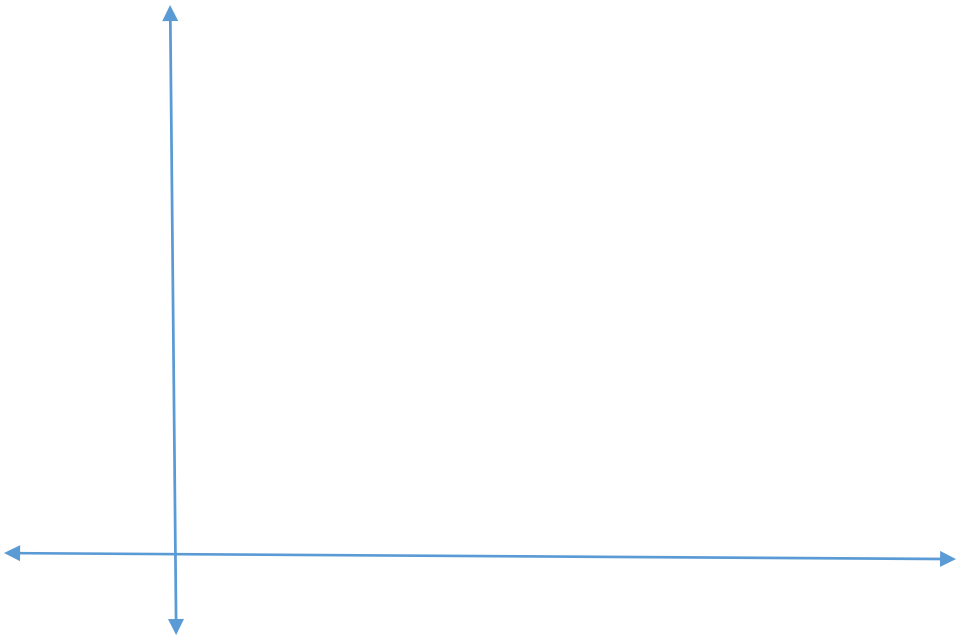
2. Jonah is going to the store to buy candles. Large candles (x) cost \$5.00 and small candles (y) cost \$4.00. He needs to buy at least 10 candles (not all of the same type), and he cannot spend more than \$80.

   a) Write a system of <u>four</u> linear inequalities that represents the problem and 'sketch' a rough graph and shade in the solution set.
   b) 'Demonstrate' one of the solutions in the shaded region satisfies the problem.



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3. a. Find the real and imaginary parts for the solution(s) to the quadratic equation:

$$5z^2 - 2iz + 3 = 0$$

b. Demonstrate that one of the solutions, of your choice, is a root.

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4. Solve $y - 36 = 9\sqrt{7}$.

5. For $f(x) = -2x^2 - x + 3$, find $f(x - b)$.

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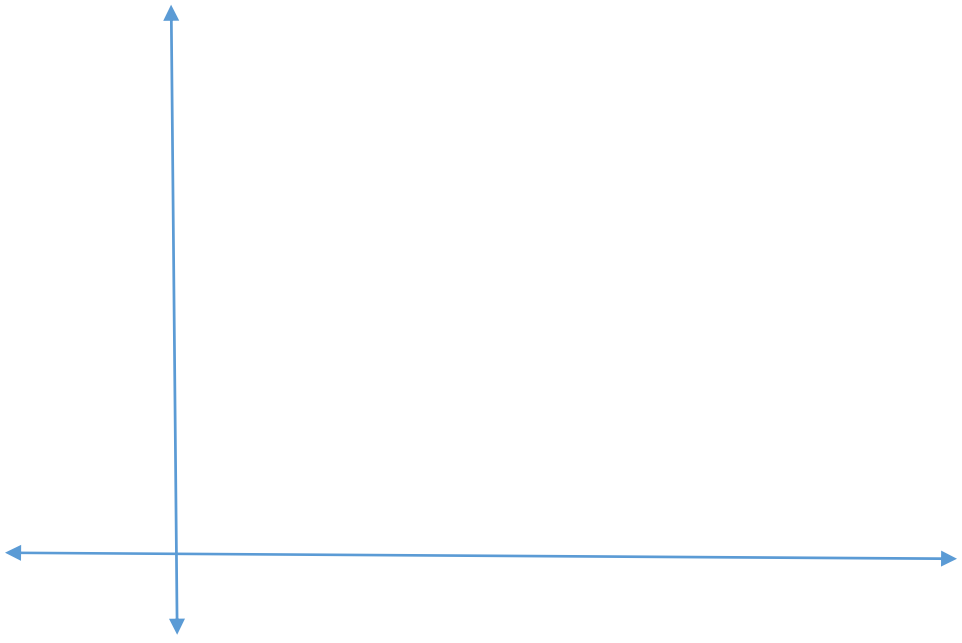
6. a) Put the function $f(x) = x^2 - x + 3$ into standard form.
   b) Find the inverse function of $f(x) = x^2 - x + 3$ that has the range $(-\infty, 1]$.
   c) Find the domain for your inverse function.
   d) Graph both the original function and its inverse graph and circle the inverse function part of the inverse graph.



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7. You are given one of the roots of the polynomial
   $f(x) = x^4 - 4x^3 + 3x^2 + 2x + c$ is $1 + i$. Find c.

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8. Completely factor the polynomial you found in part #7 into linear factors and sketch a graph showing the roots, y-intercept, and general correct shape.