EXAM 2 - MATH 111   Friday, February 27

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10
points. It is necessary to show **all** your work. Correct answers without explanations are
worth 0 points. GOOD LUCK!!

1. Each ounce of substance A supplies 6% of a nutrient that a patient needs, and each ounce of
   of substance B supplies 10% of the same nutrient. If the total number of ounces given to the
   patient was 14 and 100% of the nutrient was supplied, how many ounces of each substance
   was given?

   (a) Introduce variables and explain precisely their meaning and the units used.

   (b) Write two equations that reflect the statements in the problem.

   (c) Solve the system of equations to answer the question posed.

2. A company produces a logic board for computers. The annual fixed cost is $345,000 and the
   variable cost is $125 per board. Suppose the logic board sells for $489.

   (a) If x is the number of boards produced and sold, write equations for the revenue, cost
       and profit:

       $R(x) =$

       $C(x) =$

       $P(x) =$

   (b) Find the production **range** (in number of boards) that will give a profit for this product.

3. A parabola has vertex at $(-2, 7)$ and passes through the point $(3, -43)$. Find an equation for this parabola.

4. Consider the quadratic function $f(x) = x^2 + 2x - 15$. Answer the following questions **without using a calculator**.

   (a) The vertex:

   (b) Opens:

   (c) y-intercept:

   (d) x-intercepts:

   (e) Sketch the graph.

5. Solve the following equations with the method requested:

(a) $x^2 - 4x - 9 = 0$ by completing the square.

(b) $2x^2 + 5x + 3 = 0$ using the quadratic formula.