Name: _____ **Math 1030 Quiz #4** (July 24th, 2015)

You may **skip ONE** of the following problems.

1. Emily owns "Shoes by Twos". She sells 2000 pairs of a particular style of shoe each year. She can purchase these shoes for \$20 a pair. Shipping costs \$100 per order. Also, it costs her \$1 to store a pair of shoes for a year (base inventory costs on average inventory with all of the standard assumptions). Let $C(x)$ be Emily's annual cost function for these shoes.

   $C(x) =$ _____

   List **ALL** of the critical points of $C(x)$ including "irrelevant" critical points (points outside the domain of reasonable x values). Round each to 3 decimal places.

   Critical points: $x =$ _____

   Emily's **ideal** EOQ is $x =$ _____ and minimum annual cost is $C(x) =$ \$_____.

2. Let $f(x) = \begin{cases} x^2 + 2x + 7 & x \leq 1 \\ -x^2 - 3x + 15 & x > 1 \end{cases}$ Sketch the graph of $y = f(x)$ where $-2 \leq x \leq 3$.

   $f(x)$ has _____ critical points. They are located at $x =$ _____.
   [List **all** critical points. Round to 3 decimal places.]

   Example of a piecewise function In Alpha: The absolute value function can be defined piecewise as

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   piecewise[{{x, x >= 0}, {-x, x < 0}}]
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3. Bob typically sells 10 sketches when he charges \$50 per sketch. On the other hand, if Bob charges \$20, he typically sells 22 sketches.

   Given this data, Elasticity E = _____.

   If Bob's point elasticity is "$\varepsilon = 0.755$" when he charges \$35 per sketch, should Bob raise or lower his price to increase his revenue? Or has Bob already maximized his revenue? [Circle the correct answer.]

   Raise Prices / Lower Prices / Has Maximized Revenue