Quiz 4 Solutions
MAC 1147.3881, Fall 2015
Thursday, October 1, 2015

Show all relevant work to support your answer. A correct answer without supporting work will not earn the points. **Problems 3 and 4 are on the back.**

1. (1 point) What is your favorite place to travel? (Hint: There is no wrong answer)

1. ⎯⎯⎯⎯⎯⎯

2. (4 points) Given the function $f(x) = x^3 + 6x^2 + 11x + 6$ has a zero at $x = -2$, determine the following:

   (a) the other two zeros of $f(x)$.

   > **Solution:** Using synthetic (or long) division, we get 1, 4, 3 as the coefficients of the quotient (with remainder 0). Hence the quotient is $f(x) = x^2 + 4x + 3$. Factoring, we see $f(x) = (x+1)(x+3)$, and so the other zeros are $x = -3, -1$.

   (b) the right and left hand behaviors of $f(x)$.

   > **Solution:** Since the leading exponent (3) is odd with positive coefficient (1), the function resembles the shape of $f(x) = x^3$. Hence, $f(x) \to -\infty$ as $x \to -\infty$ and $f(x) \to \infty$ as $x \to \infty$.

3. (2 points) Which of the following equations represents the parabola with vertex $(2, -2)$ and point $(0,0)$?

    A. $f(x) = \frac{1}{2}(x-2)^2 - 2$

    B. $f(x) = \frac{1}{2}(x+2)^2 + 2$

    C. $f(x) = (x-2)^2 - 2$

    D. $f(x) = 2(x-2)^2 + 2$

    E. $f(x) = x^2 + 2x - 2$

Solution: The general equation of a parabola is $y = a(x-h)^2 + k$. Since (h,k) represents the vertex, then $y = a(x-2)^2 - 2$. To find a, plug in the point $(0,0)$ to get $0 = a(0-2)^2 - 2$. Solving the equation, we see $a = \frac{1}{2}$ so that the solution is represented by choice "A".

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4. (3 points) Find the inverse function of $f(x) = \sqrt[3]{3x+4}$.

Solution: Switching x and y, we see $x = \sqrt[3]{3y+4}$. Now cube both sides to get $x^3 = 3y + 4$. Then after solving for y, we get $f^{-1}(x) = \dfrac{x^3 - 4}{3}$ as our solution.