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Quiz 3 Solutions
MAC 1147.6861, Fall 2016
Thursday, September 15, 2016

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 food? (Hint: There is no wrong answer)

1. _____

2. (4 points) Given the points $(2, 6)$ and $(5, 10)$, compute the following:
   (a) the slope of the line passing through the points

Solution: The slope is $\dfrac{10-6}{5-2} = \dfrac{4}{3}$.

   (b) the equation of the line passing through the points

Solution: Using the equation $y - y_1 = m(x - x_1)$ with $m = \frac{4}{3}$ and $(x_1, y_1) = (2, 6)$, we get $y - 6 = \frac{4}{3}(x - 2)$. Simplifying the equation, we get $y = \frac{4}{3}x + \frac{10}{3}$ as the solution. Note that we could have used $(x_1, y_1) = (5, 10)$.

3. (2 points) Use algebraic tests to check for symmetry with respect to both axis and the origin: $f(x) = \dfrac{1}{x^2+1}$.

Solution: For y-axis symmetry, we notice $f(-x) = \dfrac{1}{(-x)^2+1} = \dfrac{1}{x^2+1} = f(x)$. Hence $f(x)$ is symmetric with respect to the y-axis.

For x-axis symmetry, we notice $-f(x) = -\dfrac{1}{x^2+1} \neq f(x)$. Hence $f(x)$ is not symmetric to the x-axis.

For origin symmetry, we compute $-f(-x) = -\dfrac{1}{(-x)^2+1} = -\dfrac{1}{x^2+1} \neq f(x)$. Then $f(x)$ is not symmetric to the origin.

4. (3 points) Let $f(x) = \begin{cases} 4-5x & \text{if } x \leq -2 \\ 0 & \text{if } -2 < x < 2 \\ x^2+1 & \text{if } x \geq 2 \end{cases}$

Compute $f(-3) + f(4) + f(-1)$.

Solution: Observe that $f(-3) = 4-5(-3) = 19$, $f(4) = 4^2+1 = 17$, and $f(-1) = 0$. Hence $f(-3) + f(4) + f(-1) = 19 + 17 + 0 = 36$.