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Quiz 2 Solutions
MAC 1147.6861, Fall 2016
Thursday, September 8, 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) Solve the following inequalities using interval notation:

(a) $\left|\frac{x-3}{2}\right| \geq 4$

Solution: The inequality translates to $\left(\frac{x-3}{2}\right) \geq 4 \cup -\left(\frac{x-3}{2}\right) \geq 4$. Solving $\left(\frac{x-3}{2}\right) \geq 4$ for x, we get $x \geq 11$. As for the second inequality, we get $x \leq -5$. Hence, the solution is $(-\infty, -5] \cup [11, \infty)$.

(b) $-1 \leq 2 - \frac{x}{3} \leq 1$

Solution: Subtract 2 from all parts of the inequality to get $-3 \leq -\frac{x}{3} \leq -1$. Now multiply everything by -3 to get $3 \leq x \leq 9$. Hence our solution is $[3, 9]$.

3. (2 points) Solve the following equation by extracting square roots: $9x^2 = 25$.

Solution: Taking square roots of both sides, we see $3x = \pm 5$. Hence $x = \pm\frac{5}{3}$.

4. (3 points) Solve the following radical equation for x: $2\sqrt{x+1} - \sqrt{2x+3} = 1$.

Solution: We can solve the equation in the following steps:

$$\begin{aligned}
2\sqrt{x+1} - \sqrt{2x+3} &= 1 \\
2\sqrt{x+1} &= 1 + \sqrt{2x+3} \\
(2\sqrt{x+1})^2 &= (1 + \sqrt{2x+3})^2 \\
4(x+1) &= 1 + 2\sqrt{2x+3} + (2x+3) \\
4x + 4 &= 2x + 4 + 2\sqrt{2x+3} \\
2x &= 2\sqrt{2x+3} \\
x &= \sqrt{2x+3} \\
x^2 &= (\sqrt{2x+3})^2 \\
x^2 &= 2x + 3 \\
x^2 - 2x - 3 &= 0 \\
(x+1)(x-3) &= 0 \\
x &= -1, 3.
\end{aligned}$$

Finally checking both solutions in the equation, we find 3 is the only valid solution to the problem.