10/13/2010 Fall 10, College Algebra I Quiz 5 Solutions Sitaraman
Math 006-19 Howard University Mathematics Dept

1. Solve and write the answer in interval form: $|x-2|>1$.

Soln:

$$|x-2|>1 \Rightarrow x-2>1 \; OR \; x-2<-1 \Rightarrow x>3 \; OR \; x<1$$

In interval notation: $(-\infty,1)U(3,\infty)$.

2. (10 points) A bag contains dimes and nickels. The total number of coins is 201. The total value of the coins is 18 dollars and 40 cents. How many nickels and how many dimes are in it? [You MUST use algebra. It is okay if you use two variables or a method different from what was done in book or in class as long as it uses algebra].

Soln: Let x be the number of dimes. Since there are 201 coins totally, there are $201-x$ nickels. the total value is $10(number\ of\ dimes)+5(number\ of\ nickels)=10x+5(201-x)=1840$. Simplifying, we get $10x+10005-5x=1840$ which gives $5x=835$ which means $x=167$. So there are 167 dimes and 201-167=34 nickels. Check that $167(10)+34(5)=1840$.

3.Write the following sentence as a mathematical equation in ONE variable: The cost of renting a car for a day at the rate of 100 dollars rental fee plus 25 cents for each mile driven turns out to be equal to 150 dollars. (The number of miles driven is unknown)

Soln: Let C represent the cost. Then we get $C=100+(0.25)x$ where x is the number of miles driven.

4. (10 points) Kevin can do a job in 5 hours. Kevin and Max can do the same in 3 hours. How long would Max take to do it himself?

Soln: Speed of work is 1/5 of job in one hour for Kevin and 1/3 of job in 1 hour for both together. Let t be the time taken by Max by himself. Then his speed is $1/t$ per hour. We get that in one hour, $\frac{1}{5}+\frac{1}{t}=\frac{1}{3}$. Simplifying, we get $\frac{1}{t}=\frac{1}{3}-\frac{1}{5}=\frac{2}{15}$. So $t=15/2=7.5$ hours.

5.(bonus 10 points) Terrell can run 40 yards in 4.36 seconds. Darrelle can do the same in 4.38 seconds. If Terrell gets a head start of 0.5 seconds,

how long would it take for Darrelle to catch up? [Assume they both start from same location].

Note: There was a typo in this problem. Terrell's 40 yard time is supposed to be 4.38 and Darrelle's time is 4.36 seconds. I gave you full credit if you wrote the right equation.

Let t be the time that Terrell runs. Then Darrelle runs $t - 0.5$ seconds. before he catches up with Terrell. Since they start from same place, they would have run the same distance when he catches up. Distance is given by time times speed. Terrell's speed is $40/4.38$ yards per second and Darrelle's speed is $40/4.36$ yards per seocnd. So we get $t(40/4.38) = (t - 0.5)(40/4.36)$. Simplifying, we get $4.36t = 4.38(t - 0.5) = 4.38t - (4.38 * 0.5)$ which gives $0.02t = 2.19$ which gives $t = 109.5$ seconds.