

Name:

Quiz 4

Math 100 Fall 2011

Write your answers to the following questions in the space below. You may also use the reverse side of this sheet, if you need more room.

1. (10 pts.) Find the solution set for the following equality AND draw a picture on the number line:

$$\left| \frac{5t - 10}{6} \right| > \frac{5}{3}.$$

SOLUTION:

$$\begin{aligned} \frac{5t - 10}{6} > \frac{5}{3} \quad \text{or} \quad \frac{5t - 10}{6} < -\frac{5}{3} \\ 5t - 10 > \frac{30}{3} = 10 \quad \text{or} \quad 5t - 10 < -10 \\ 5t > 20 \quad \text{or} \quad 5t < 0 \\ t > 4 \quad \text{or} \quad t < 0 \end{aligned}$$

The solution set is $(-\infty, 0) \cup (4, \infty)$, with corresponding picture.

2. (10 pts.) Find the solution set for the following equality:

$$\left| \frac{2r}{3} + \frac{5}{6} \right| = \left| \frac{r}{2} - 3 \right|.$$

SOLUTION:

$$\begin{aligned} \frac{2r}{3} + \frac{5}{6} = \frac{r}{2} - 3 \quad \text{or} \quad \frac{2r}{3} + \frac{5}{6} = -\left(\frac{r}{2} - 3\right) \\ 4r + 5 = 3r - 18 \quad \text{or} \quad 4r + 5 = -(3r - 18) \quad [\text{Multiply both sides by 6}] \\ r = -23 \quad \text{or} \quad 7r = 13 \\ r = -23 \quad \text{or} \quad r = \frac{13}{7} \end{aligned}$$

The solution set is thus $\{-23, \frac{13}{7}\}$. Remember, it is always a good idea to check your answer. For example, with a calculator, I quickly compute $\frac{2}{3} \cdot \frac{13}{7} + \frac{5}{6} \approx 2.0714$ and $\frac{1}{2} \cdot \frac{13}{7} - 3 \approx -2.0714$. The difference in sign is a bit disconcerting, until we realize we are taking the absolute value of both of these quantities!