

# Math 1513 - College Algebra

## Discussion Board Week 3 - Due 2012.01.28

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We will solve the first problem:

$$2 \leq \left| \frac{1}{2}x - 2 \right| < 3$$

First, we break this up into two problems. Remember that  $a < |f(x)| < b$  is the same as  $a < f(x) < b$  or  $a < -f(x) < b$ , as was pointed out in the discussion board this week. So we use this to get:

$$2 \leq \left| \frac{1}{2}x - 2 \right| < 3 \longrightarrow 2 < \frac{1}{2}x - 2 < 3 \text{ or } 2 < -\left(\frac{1}{2}x - 2\right) < 3$$

The first one is easy to solve:

$$\begin{aligned} 2 < \frac{1}{2}x - 2 < 3 &\longrightarrow 4 < \frac{1}{2}x < 5 \\ &\longrightarrow 8 < x < 10 \end{aligned}$$

For the second one, we need to get rid of the minus sign in the middle first, and then proceed as in the first piece.

$$\begin{aligned} 2 < -\left(\frac{1}{2}x - 2\right) < 3 &\longrightarrow -3 < \frac{1}{2}x - 2 < -2 \\ &\longrightarrow -1 < \frac{1}{2}x < 0 \\ &\longrightarrow -2 < x < 0 \end{aligned}$$

Thus, our final solution is  $x \in (-2, 0) \cup (8, 10)$ .