

EXTEND

- Identify the error in solving the absolute value equation.
- Correct the error. Show your steps.
- Explain how one might have made the error.
- Justify the correct answer and steps.

$$|2x - 1| = 9$$

$$\begin{array}{r} 2x - 1 = 9 \\ +1 \quad +1 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{10}{2}$$

$$x = 5$$

$$\begin{array}{r} 2x - 1 = -9 \\ +1 \quad +1 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{-8}{2} \text{ error}$$

$$x = 4$$

$$\begin{array}{r} 2x - 1 = -9 \\ +1 \quad +1 \\ \hline \end{array}$$

$$\frac{2x}{2} = \frac{-8}{2}$$

$$x = -4$$

Possible Student Responses:

- The negative sign was left out.
- Since -9 is farther from 0 than 1 , you subtract 9 and 1 and make the answer negative.
- -9 minus 1 gives you -8 .

- Identify the error in solving the absolute value equation.
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$$\begin{array}{r} -3 | x - 4 | - 4 = 3 \\ \quad \quad \quad +4 \quad +4 \\ \hline \end{array}$$

$$\begin{array}{r} -3 | x - 4 | = 7 \\ \quad \quad \quad -3 \quad -3 \\ \hline \end{array}$$

$$|x - 4| = -\frac{7}{3} \quad \leftarrow \text{error}$$

$$\begin{array}{r} x - 4 = -\frac{7}{3} \\ \quad \quad \quad +4 \quad +4 \\ \hline \end{array}$$

$$x = \frac{5}{3}$$

or

$$\begin{array}{r} x - 4 = \frac{7}{3} \\ \quad \quad \quad +4 \quad +4 \\ \hline \end{array}$$

$$x = \frac{19}{3}$$

Possible Student Responses

- When the absolute value was isolated, it equals a negative number. So it is a $\emptyset$.
- Absolute value equations cannot equal a negative number.

- Identify the error in solving the absolute value equation.
- Correct the error. Show your steps.
- Explain how one might have made the error.
- Justify the correct answer and steps.

$$\begin{array}{rcl}
 |2x - 3| + 4 = 7 & & \\
 \downarrow \text{error} & & \\
 \begin{array}{r}
 |2x - 3| + 4 = 7 \\
 \hline
 \textcircled{+3} \quad \textcircled{+3} \\
 \hline
 2x + 4 = 10 \\
 -4 \quad -4 \\
 \hline
 2x = 6 \\
 \frac{2x}{2} = \frac{6}{2} \\
 x = 3
 \end{array} & \text{or} &
 \begin{array}{r}
 |2x - 3| + 4 = -7 \\
 \hline
 \textcircled{+3} \quad \textcircled{+3} \quad \text{error} \\
 \hline
 2x + 4 = -4 \\
 -4 \quad -4 \\
 \hline
 2x = -8 \\
 \frac{2x}{2} = \frac{-8}{2} \\
 x = -4
 \end{array}
 \end{array}$$

$$\begin{array}{rcl}
 |2x - 3| + 4 = 7 & & \\
 -4 \quad -4 & & \\
 \hline
 |2x - 3| = 3 & & \\
 \begin{array}{r}
 2x - 3 = 3 \\
 +3 \quad +3 \\
 \hline
 2x = 6 \\
 \frac{2x}{2} = \frac{6}{2} \\
 x = 3
 \end{array} & &
 \begin{array}{r}
 2x - 3 = -3 \\
 +3 \quad +3 \\
 \hline
 2x = 0 \\
 \frac{2x}{2} = \frac{0}{2} \\
 x = 0
 \end{array}
 \end{array}$$

Possible Student Responses

- The equation was split before the absolute value was isolated, and added 3 from inside the absolute value instead of subtracting 4 from outside the absolute value.