

Absolute Value Inequalities and Tolerance Practice

Name Answer Key

Absolute Value Inequalities

1.  $|2x - 3| < 17$

$2x - 3 < 17$  and  $2x - 3 > -17$

$x < 10$  and  $x > -7$

$-7 < x < 10$

3.  $|6x - 5| - 2 \geq 29$

$|6x - 5| \geq 31$

$6x - 5 \geq 31$  or  $6x - 5 \leq -31$

$x \geq 6$  or  $x \leq -\frac{13}{3}$  or  $-4.\bar{3}$

5.  $-9|5x - 4| + 3 > 3$

$|5x - 4| < 0$

$5x - 4 < 0$  and  $5x - 4 > 0$

$x < \frac{4}{5}$  and  $x > \frac{4}{5}$  **No Solution**

2.  $-6|4 - 2x| < -24$

$|4 - 2x| > 4$

$4 - 2x > 4$  or  $4 - 2x < -4$

$x < 0$  or  $x > 4$

4.  $-5 + 3|4x - 7| \leq 16$

$|4x - 7| \leq 7$

$4x - 7 \leq 7$  and  $4x - 7 \geq -7$

$x \leq \frac{7}{2}$  or  $3.5$  and  $x \geq 0$

$0 \leq x \leq \frac{7}{2}$

6.  $2|2x - 3| + 6 \geq -20$

$|2x - 3| \geq -13$

$2x - 3 \geq -13$  or  $2x - 3 \leq 13$

$x \geq -5$  or  $x \leq 8$

**All Real #s**

Tolerance

1) In scientific laboratory work, the error associated with a measurement is the amount by which the measurement differs from the true value. Error is expressed as a number greater than or equal to 0. The true value of the freezing point of a certain liquid is  $-45^\circ\text{C}$ , but it has been known to freeze between  $-42^\circ\text{C}$  and  $-48^\circ\text{C}$ . Write and solve an inequality that will describe the freezing point of this liquid.

$|x + 45| \leq 3$

$x + 45 \leq 3$  and  $x + 45 \geq -3$

$-48 \leq x \leq -42$

2) A city ordinance states that pools must be enclosed by a fence that is from 3 to 8 ft high. Write an absolute value inequality describing fences that don't meet this ordinance.

$|x - 5.5| \leq 2.5$

3) A fabrication shop has a tolerance of 0.0025 millimeters for the diameter a piston they are machining in the new HHO car. The piston should have a diameter of 8mm. Write and solve an absolute value inequality that describes unacceptable diameters of the pistons.

$|x - 8| \leq 0.0025$

$7.9975 \leq x \leq 8.0025$