A.REI.D.11: Absolute Value Inequalities 1a

1 The solution set of the inequality $|x-3|<5$ is
1) $\{x<8 \text{ and } x<-2\}$
2) $\{x<8 \text{ or } x<-2\}$
3) $\{x<8 \text{ and } x>-2\}$
4) $\{x>8 \text{ or } x<-2\}$

2 The solution set of $|x-3|>5$ is
1) $\{x<8 \text{ and } x<-2\}$
2) $\{x<8 \text{ or } x<-2\}$
3) $\{x<8 \text{ and } x>-2\}$
4) $\{x>8 \text{ or } x<-2\}$

3 What is the solution of the inequality $|x+3|\le 5$?
1) $-8\le x\le 2$
2) $-2\le x\le 8$
3) $x\le -8$ or $x\ge 2$
4) $x\le -2$ or $x\ge 8$

4 What is the solution of the inequality $|y+8|>3$?
1) $y>-5$ or $y<-11$
2) $y>-5$
3) $-11<y<-5$
4) $-5<y<11$

5 The solution of $|2x-3|<5$ is
1) $x<-1$ or $x>4$
2) $-1<x<4$
3) $x>-1$
4) $x<4$

6 What is the solution of the inequality $|2x-5|<1$?
1) $x<3$
2) $2<x<3$
3) $x>-3$
4) $x\le 2$ or $x\ge 3$

7 What is the solution of the inequality $|3x+6|\le 30$?
1) $-12\le x\le 8$
2) $-8\le x\le 12$
3) $x\le -12$ or $x\ge 8$
4) $x\le -8$ or $x\ge 12$

8 What is the solution of the inequality $|2x-1|<9$?
1) $\{x\,|\,-4<x<5\}$
2) $\{x\,|\,x<-4 \text{ or } x>5\}$
3) $\{x\,|\,x<5\}$
4) $\{x\,|\,x<-4\}$

9 Which represents the solution set for x in the inequality $|2x-1|<7$?
1) $\{x|x<-3 \text{ or } x>4\}$
2) $\{x|x<-4 \text{ or } x>3\}$
3) $\{x|-4<x<3\}$
4) $\{x|-3<x<4\}$

10 The solution set of $|x-2|<3$ is
1) $\{x\,|\,x>5\}$
2) $\{x\,|\,x<-1\}$
3) $\{x\,|\,-1<x<5\}$
4) $\{x\,|\,x<-1 \text{ or } x>5\}$

11 What is the solution set of $|4x+8|>16$?
1) $\{x\,|\,-6<x<2\}$
2) $\{x\,|\,-2<x<6\}$
3) $\{x\,|\,x<-6 \text{ or } x>2\}$
4) $\{x\,|\,x<-2 \text{ or } x>6\}$

12 Which is the solution set for $|x-1|<5$?
1) $\{x\,|\,-6<x<4\}$
2) $\{x\,|\,-4<x<6\}$
3) $\{x\,|\,x<-4 \text{ or } x>6\}$
4) $\{x\,|\,x<-6 \text{ or } x>4\}$

13 What is the solution set of the inequality $|3-2x| \geq 4$?

1) $\left\{x \mid \frac{7}{2} \leq x \leq -\frac{1}{2}\right\}$
2) $\left\{x \mid -\frac{1}{2} \leq x \leq \frac{7}{2}\right\}$
3) $\left\{x \mid x \leq -\frac{1}{2} \text{ or } x \geq \frac{7}{2}\right\}$
4) $\left\{x \mid x \leq \frac{7}{2} \text{ or } x \geq -\frac{1}{2}\right\}$

14 Which equation states that the temperature, t, in a room is less than 3° from 68°?

1) $|3-t| < 68$
2) $|3+t| < 68$
3) $|68-t| < 3$
4) $|68+t| < 3$

15 The solution set of $|3x+2| < 1$ contains

1) only negative real numbers
2) only positive real numbers
3) both positive and negative real numbers
4) no real numbers

16 If $|2x+3| < 1$, then the solution set contains

1) only negative real numbers
2) only positive real numbers
3) both positive and negative real numbers
4) no real numbers

17 Which value of a does not satisfy the inequality $|a| > 2a - 3$?

1) -1
2) 0
3) 3
4) -5

18 The inequality $-3 < x < 7$ is the solution of

1) $|x-2| > 5$
2) $|x-2| < 5$
3) $|x+2| > 5$
4) $|x+2| < 5$

19 What is the solution of the inequality $|2x-5| \leq 11$?

20 Solve $|2x-3| > 5$ algebraically.

21 Solve $|-4x+5| < 13$ algebraically for x.

22 Solve algebraically for c: $\left|\frac{3}{2}c - 10\right| - 9 \leq -1$

23 Solve algebraically for x: $|3x-5| - x < 17$

24 The inequality $|1.5C - 24| \leq 30$ represents the range of monthly average temperatures, C, in degrees Celsius, for Toledo, Ohio. Solve for C.

25 A depth finder shows that the water in a certain place is 620 feet deep. The difference between d, the actual depth of the water, and the reading is $|d-620|$ and must be less than or equal to $0.05d$. Find the minimum and maximum values of d, to the *nearest tenth of a foot*.

26 The heights, h, of the students in the chorus at Central Middle School satisfy the inequality $\left|\frac{h-57.5}{2}\right| \leq 3.25$, when h is measured *in inches*. Determine the interval in which these heights lie and express your answer to the *nearest tenth of a foot*. [Only an algebraic solution can receive full credit.]

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Answer Section

1 ANS: 3 REF: 019719siii
2 ANS: 4 REF: 019823siii
3 ANS: 1

$$\begin{array}{ll} x+3\le 5 & x+3\ge -5 \\ x\le 2 \text{ and} & x\ge -8 \end{array}$$

REF: 080203b
4 ANS: 1

$$\begin{array}{ll} y+8>3 & y+8<-3 \\ y>-5 \text{ or} & y<-11 \end{array}$$

REF: 010610b
5 ANS: 2

$$\begin{array}{ll} 2x-3<5 & 2x-3>-5 \\ x<4 \text{ and} & x<-1 \end{array}$$

REF: 080509b
6 ANS: 2

$$\begin{array}{ll} 2x-5<1 & 2x-5>-1 \\ 2x<6 \text{ and} & 2x>4 \\ x<3 & x>2 \end{array}$$

REF: 060907b
7 ANS: 1 REF: 069821siii
8 ANS: 1

$$\begin{array}{ll} 2x-1<9 & 2x-1>-9 \\ x<5 \text{ and} & x>-4 \end{array}$$

REF: 010710b
9 ANS: 4 REF: 068024siii
10 ANS: 3 REF: 068718siii
11 ANS: 3 REF: 010423siii
12 ANS: 2 REF: 018921siii
13 ANS: 3

$$\begin{array}{ll} 3-2x\ge 4 & 3-2x\le -4 \\ -2x\ge 1 \text{ or} & -2x\le -7 \\ x\le -\frac{1}{2} & x\ge \frac{7}{2} \end{array}$$

REF: 060318b
14 ANS: 3 REF: 060107b

15 ANS: 1

$3x+2<1 \quad 3x+2>-1$

$x<-\frac{1}{3}$ and $x>-1$

REF: 080102b

16 ANS: 1 REF: 019926siii

17 ANS: 3

$a>2a-3 \quad a<-2a+3$

$2a-3<a$ or $3a<3$

$a<3 \quad a<1$

REF: 060808b

18 ANS: 2 REF: 069426siii

19 ANS:

$2x-5\le 11 \quad 2x-5\ge -11$

$-3 \le x \le 8.$ $2x\le 16$ and $2x\ge -6$

$x\le 8 \quad x\ge -3$

REF: 010925b

20 ANS:

$2x-3>5$ or $2x-3<-5$

$2x>8 \quad 2x<-2$

$x>4 \quad x<-1$

REF: 061430a2

21 ANS:

$-4x+5<13 \quad -4x+5>-13 \quad -2<x<4.5$

$-4x<8 \quad -4x>-18$

$x>-2 \quad x<4.5$

REF: 011432a2

22 ANS:

$\left|\frac{3}{2}c-10\right|\le 8 \quad \frac{3}{2}c-10\le 8$ and $\frac{3}{2}c-10\ge -8$

$\frac{3}{2}c\le 18 \quad \frac{3}{2}c\ge 2$

$c\le 12 \quad c\ge \frac{4}{3}$

REF: 061637a2

23 ANS:
$|3x-5| < x+17$ $3x-5 < x+17$ and $3x-5 > -x-17$ $-3 < x < 11$

$$2x < 22 \qquad 4x > -12$$
$$x < 11 \qquad x > -3$$

REF: 081538a2

24 ANS:
$-4 \le C \le 36$. $1.5C - 24 \le 30$ and $1.5C - 24 \ge -30$

$$C \le 36 \qquad C \ge -4$$

REF: 010326b

25 ANS:

$$d - 620 \le 0.05d \qquad d - 620 \ge -0.05d$$

590.5, 652.6. $.95d \le 620$ and $1.05d \ge 620$

$$d \le 652.6 \qquad d \ge 590.5$$

REF: 080427b

26 ANS:

$$\frac{h-57.5}{2} \le 3.25 \qquad \frac{h-57.5}{2} \ge -3.25$$

4.3-5.3. $h - 57.5 \le 6.5$ and $h - 57.5 \ge -6.5$. To convert from feet to inches, divide the answers by 12:

$$h \le 64 \qquad h \ge 51$$

$h \le 5.3$ and $h \ge 4.3$

REF: 010531b