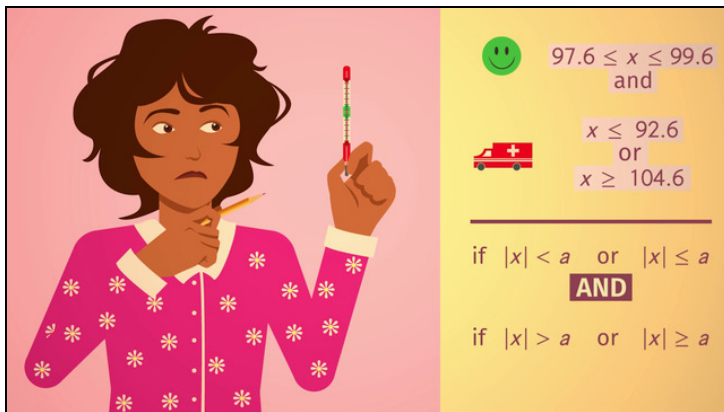




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# Absolute Value Inequalities



- 1 Evaluate the absolute value inequality.
- 2 Identify the critical body temperature range.
- 3 Assign the absolute value inequality its corresponding number line.
- 4 Determine the dangerous and critical temperatures.
- 5 Solve the following absolute value inequalities.
- + with lots of tips, answer keys, and detailed answer explanations for all of the problems.

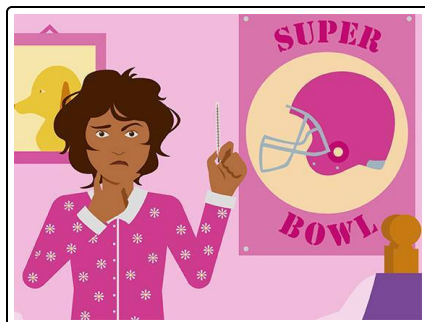


The complete package, including all problems, hints, answers, and detailed answer explanations is available for all [sofatutor.com](https://www.sofatutor.com) subscribers.



## Evaluate the absolute value inequality.

Fill in the blanks.



Daisy is planning to go to the Super Bowl parade.

Unfortunately, the parade is during the school day... so the only way she can go is by finding a way to get out of going to school that day. Daisy decides to try to pretend to be sick... by simulating an unhealthy body temperature with her thermometer.

Daisy learns that a healthy temperature for the human body is normally  $98.6^{\circ}F$ , plus or minus  $1^{\circ}F$ , and wants to use this fact to figure out which temperature she needs to have to convince everybody that she can't go to

school.

$$x - 98.6 \leq 1$$

$$-1 \leq x - 98.6$$

$$|x - 1| \leq 98.6$$

$$99.6^{\circ}F$$

$$|x - 98.6| \leq 1$$

or

inequality

and

and

$$-98.6 \leq x - 1$$

- 1 Let's say that  $x$  stands for a healthy body temperature. Knowing that  $98.6^{\circ}F$ , plus or minus  $1^{\circ}F$ , is a healthy body temperature, we get the absolute value

.....<sup>1</sup> of .....<sup>2</sup>,

- 2 Generally, for an inequality  $|x| \leq v$ , we get two statements:

$$-v \leq x \text{ ..... } ^3 x \leq v.$$

- 3 So to figure out what a healthy body temperature could be, we have to solve two inequalities:

.....<sup>4</sup> and .....<sup>5</sup>.

- 4 Solving these inequalities gives us  $x \geq 97.6$

$$\text{.....} ^6 x \leq 99.6,$$

- 5 and Daisy can conclude that a healthy body temperature is at least  $97.6^{\circ}F$  and at most .....<sup>7</sup>.

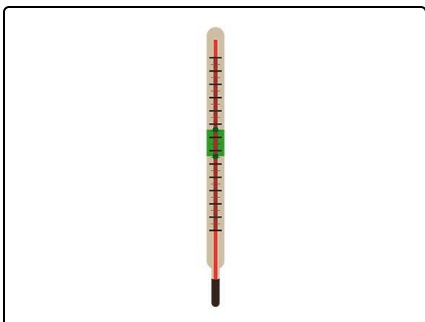


## Hints for solving these problems

1  
of 5

### Evaluate the absolute value inequality.

#### Hint #1



You can visualize how to solve this problem with a number line, like on a thermometer.

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#### Hint #2

If you subtract the normal body temperature from the highest, or the lowest, healthy body temperature you will always get  $1^{\circ}F$ , or  $-1^{\circ}F$ .

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## Answers and detailed answer explanations for these problems

1  
of 5

### Evaluate the absolute value inequality.

**Answer key:** 1: inequality // 2:  $|x - 98.6| \leq 1$  // 3: and // [4+5]1:  $-1 \leq x - 98.6$  **or**  $x - 98.6 \leq 1$  // 6: and // 7:  $99.6^\circ F$

**Each answer can only be used once. You can answer them in whatever order you want.**

Daisy knows that a healthy body temperature is  $98.6^\circ F$ , plus or minus  $1^\circ F$ .

To say this fact using inequalities, we let  $x$  stand for a healthy body temperature, and we have that  $|x - 98.6| \leq 1$ .

Solving any absolute value inequality  $|x| \leq v$  is the same as solving two different inequalities,  $-v \leq x$  **and**  $x \leq v$ , or when written together,  $-v \leq x \leq v$ .

So for the inequality  $|x - 98.6| \leq 1$ , we get

$$-1 \leq x - 98.6 \text{ and } x - 98.6 \leq 1, \text{ or } -1 \leq x - 98.6 \leq 1.$$

We can then solve both inequalities by using opposite operations:

$$\begin{array}{rcl} x - 98.6 & \geq & -1 \\ +98.6 & & +98.6 \\ \hline x & \geq & 97.6 \end{array}$$

and similarly

$$\begin{array}{rcl} x - 98.6 & \leq & 1 \\ +98.6 & & +98.6 \\ \hline x & \leq & 99.6 \end{array}$$

Combining both solutions, we get

$$97.6 \leq x \leq 99.6.$$

So a healthy body temperature is at least  $97.6^\circ F$  and at most  $99.6^\circ F$ .