

Chapter 1  
Section 1.7

Compound Inequalities

- (1) Solve  $\frac{1}{2}(x + 6) > 3$  or  $4(x - 1) < 3x - 4$ .

$$(-\infty, 0) \cup (0, \infty)$$

- (2) The price of a Full Salad at your favorite restaurant is 10 cents more than the hamburger. You are out with a group of people out to celebrate and the bill comes out with 10 hamburgers and 5 salads. If the bill was more than \$37.94 and less than \$46.04, including tax at 8% and a tip of \$5, then in what price range is a hamburger?

A hamburger costs between  
\$2 and \$2.50.

Absolute Value Inequalities

Absolute value inequalities are just a special type of compound inequalities. Most often they are used to calculate error.

**Def:** If  $L$  is the measurement you are trying to get and  $x$  is the measurement that you actually get then the **absolute error** or your measurement is  $|x - L|$ . The **relative error** of your measurement is  $|x - L|/L$ , that is, the error of your measurement relative to (as a percentage of) the desired measurement.

- (3) Write the following absolute value equations as compound inequalities with "and" or "or" in them as exercise (1) above is written.

(a)  $|x| \leq k$        $x \leq k$  and  $x \geq -k$

(b)  $|x| > k$        $x > k$  or  $x < -k$

**Q:** Explain why one of the above is written with an "and" and the other is with an "or".

Answer on extended Solutions

- (4) A technician is testing a scale with a 50-lb block of steel. The scale passes the test if the relative error when weighing the block is less than 0.1%. If  $x$  is the actual weight then for what values of  $x$  must the measurement will the scale pass?

$$49.95 < x < 50.05$$

- (5) Michelle is trying to keep the water temperature in her chemistry experiment at 35°C. For the experiment to work, the relative error for the actual temperature must be less than .8%. Write an absolute value ~~equation~~ <sup>inequality</sup> for the actual temp. What temps. will satisfy the requirement?

$$7 < x < 43$$