I. Order in the Set of Real Numbers (Which number is greater?) ( >, <)

A. A larger number is **always to the right** of a smaller number on the number line.

![Number line diagram]

B. We use $<$ for "**is less than**" and $>$ for "**is greater than**"

**Example 1** Write a true statement by filling in the blank with either $<$ or $>$:

a) $-4 \underline{\quad} -6$  
b) $\frac{1}{5} \underline{\quad} \frac{1}{6}$  
c) $-10.3 \underline{\quad} -14.5$

d) $-15 \underline{\quad} 5$  
e) $0 \underline{\quad} -10$

f) $\frac{13}{15} \underline{\quad} \frac{17}{21}$

C. Inequalities:

1) "$9 > 6$", "$8 < 12$" are called **inequalities**.

2) "$9 > 6$" and "$6 < 9$" are the same inequality.

3) $\geq$ means "**is greater than or equal to**"

4) $\leq$ means "**is less than or equal to**"

5) $x > 0$ means $x$ **is positive** and $x < 0$ means $x$ **is negative**.

**Example 2** Classify each inequality as true or false:

a) $5 \leq -5$  
b) $-5 \leq 7$  
c) $8 \geq 8$
II. Absolute Value of a Number

A. The \textit{absolute value} of a number is the distance between that number and 0 on the number line, regardless of direction. So, the absolute value of every number is either positive or 0.

B. We write $|a|$, read \textit{“the absolute value of $a$,”} to represent the number of units between 0 and $a$ on the number line.

\[
\begin{array}{c}
-4 & -3 & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\
\end{array}
\]

Example 3 \hspace{1cm} Find each absolute value:

a) $|–45|$ \hspace{1cm} b) $|4.2|$ \hspace{1cm} c) $\left| \frac{-2}{3} \right|$

C. The negative of an absolute value is written with the negative sign in front of the absolute value bars, such as $-|5|$ or $-|–8|$. You take the absolute value first and then take the opposite of your answer.

Example 4 \hspace{1cm} Write a true statement by filling in the blank with either $>$, $<$, or $=.$

a) $–5 \quad \underline{\hspace{2cm}} \quad |–6|$ \hspace{1cm} b) $|–14| \quad \underline{\hspace{2cm}} \quad \left| \frac{10}{3} \right|$ \hspace{1cm} c) $\left| \frac{3}{5} \right| \quad \underline{\hspace{2cm}} \quad |–0.6|$