Objective

- **Solve word problems involving linear inequalities** by defining variables, writing inequalities, **solving inequalities graphically and algebraically**, and writing answers as complete sentences in a group.
- Success Criteria
  - Use each step to solve the word problems
- **Vocabulary:** perimeter, rectangle, width, length, inclusively, exceeds

Math Words – Write the corresponding symbol

- Difference = —
- Sum = +
- Times = ×
- Divided = ÷
- At least = ≥
- Exceeds = >
- At most = ≤
- Inclusively = ? !
- Between = ? < ( ) < ?
- Quantity = ( )

Linear Inequality Word Problems

All steps below should be followed for every problem.

- Explicitly define all variables.
- Write two equations or inequalities that model the situation.
- Solve the problem with a valid method of your choice. Circle ones you used.
  - Graphically
  - Algebraically with substitution
  - Algebraically with elimination
  - Algebraically with matrices
- State the final answer in complete sentences, which explains the real world meaning of the solution.

DO NOW: YOU HAVE EVERYTHING YOU NEED TO SOLVE THIS

AM OBJ: WP: Linear Inequalities

1. Five times an unknown number is at least 3, and 8 more than the number exceeds 2. Find all possible values for the unknown number.

x = unknown number

$\frac{5x}{5} \geq \frac{3}{5}$ and $\begin{matrix} 8 + x > 2 \\ -8 \quad -8 \end{matrix}$

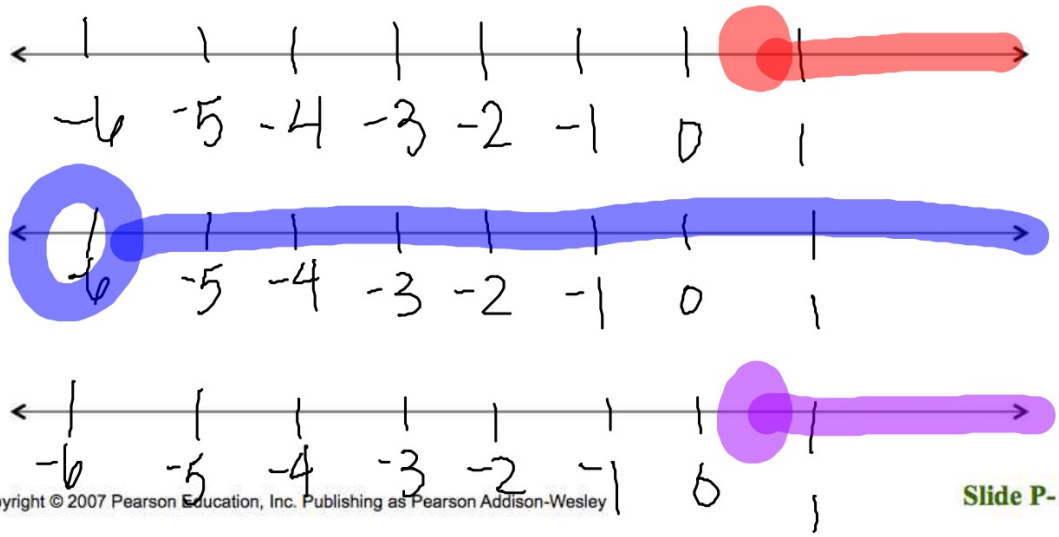
$x \geq 3/5$

$x \geq 0.6$

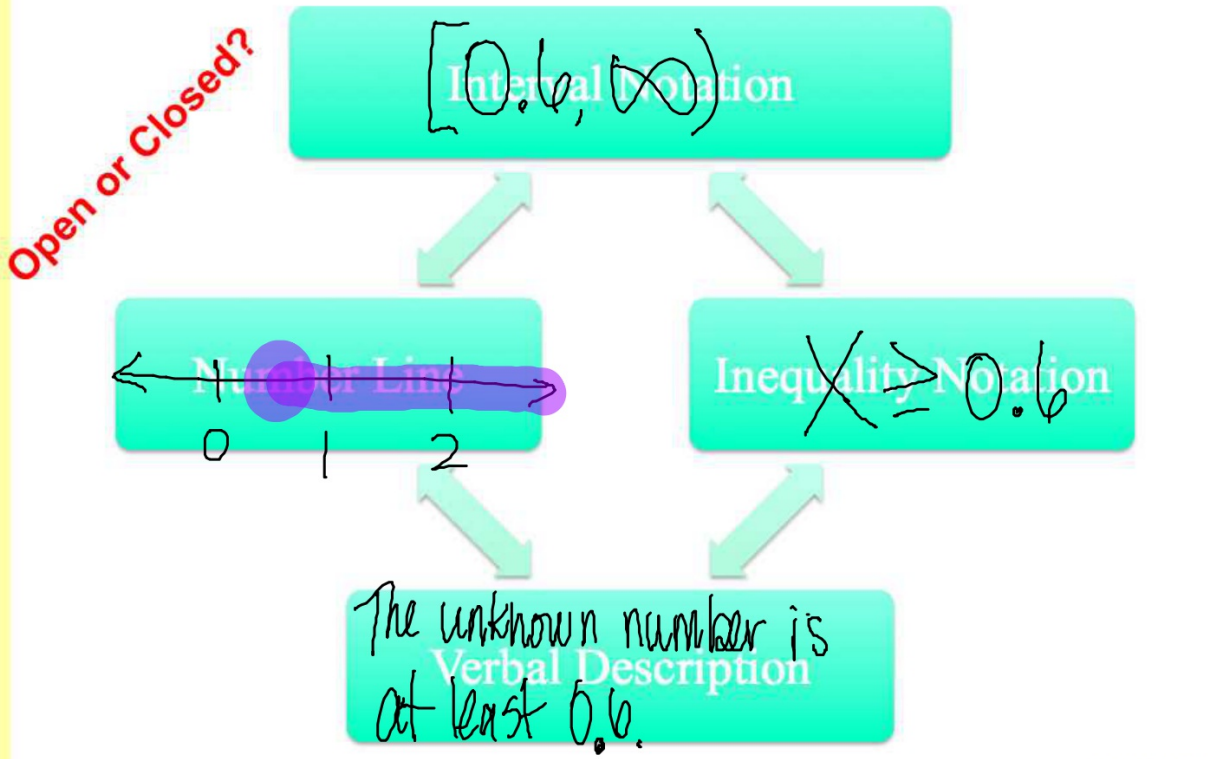
$x > -6$

Using a graph to solve

$x \geq 0.6$ and $x > -6$



Equivalent Representations for Intervals of Real Numbers



AM OBJ: WP: Linear Inequalities

2. The width of a rectangle is 15cm. Find all possible values for the length of the rectangle if the perimeter is at least 392 cm.

$P = 2w + 2l$ l = length of rectangle

$2(15) + 2l \geq 392$

$30 + 2l \geq 392$

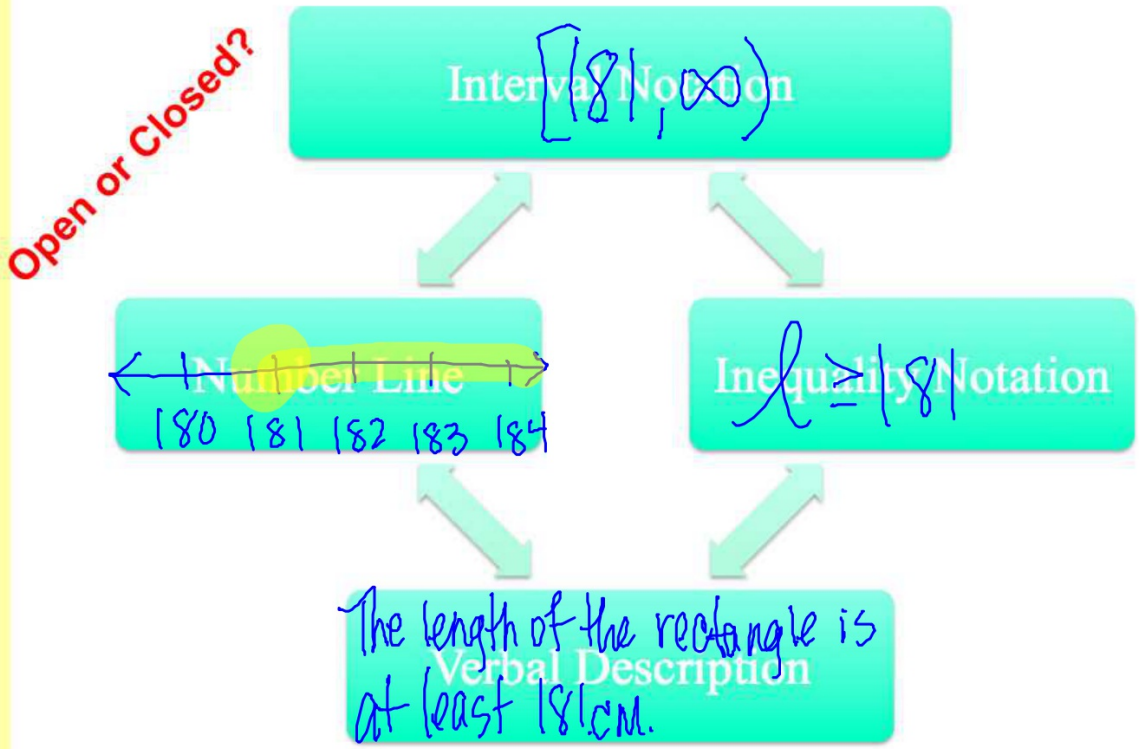
$-30 \quad -30$

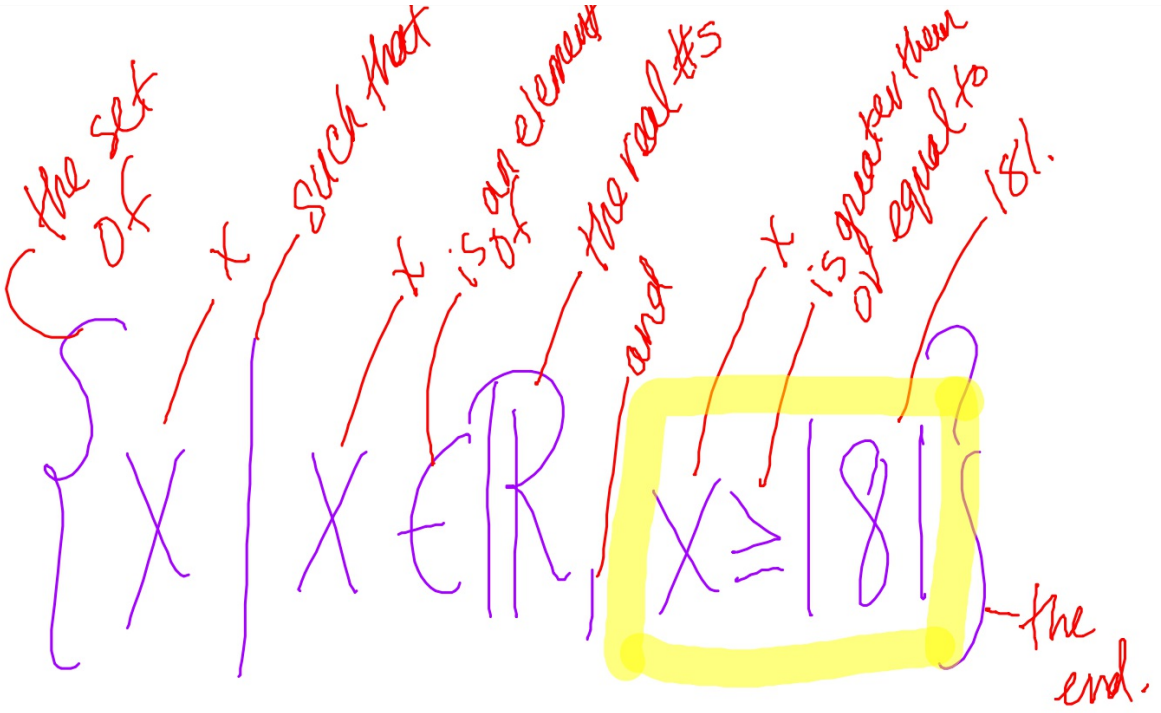
$2l \geq 362$

$\frac{2l}{2} \geq \frac{362}{2}$

$l \geq 181$

Equivalent Representations for Intervals of Real Numbers




the set of
x
such that
x
is an element of
the real #s
and
x
is greater than or equal to
18!
the end.

AM OBJ: WP: Linear Inequalities

$P = 4w$

3. The perimeter of a square is to be between 17 and 56 feet, inclusively. Find all possible values for the length of its sides.

w = width/length of square

$\frac{17}{4} \le \frac{4w}{4} \le \frac{56}{4}$

$4.25 \le w \le 14$

[A] $4.25 \le x \le 14$

[B] $8.5 \le x$ and $x \le 28$

[C] $4.25 \le x \le 52$

[D] $8.5 < x < 28$

Equivalent Representations for Intervals of Real Numbers

Open or Closed?

Interval Notation: $[4.25, 14]$

Inequality Notation: $4.25 \leq w \leq 14$

Verbal Description: The length of the sides of a square is between 4.25 and 14 inclusively.

AM OBJ: WP: Linear Inequalities

4.Five times the difference of a number and 19 is at least 155. Let x represent the number and find all possible values for the number.

$5(x-19) \geq 155$

$x \geq 50$

[A] $x \leq 50$

[B] $x \leq 12$

[C] $x \geq 12$

[D] $x \geq 50$

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Equivalent Representations for Intervals of Real Numbers