

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 operators

Math Words – Write the corresponding symbol

■ Difference = $-$

■ Sum = $+$

■ Times = $*$

■ Divided = $/$

■ At least = \geq

■ Exceeds = $>$

■ At most = \leq

■ Inclusively = \leq or \geq

■ Between = $>$ and $<$

■ Quantity = $()$

12 less than 3 times an unknown # exceeds 7. Solve for the unknown #.

7 more than 3 times an unknown # is at most 18. Solve for the unknown #.

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.

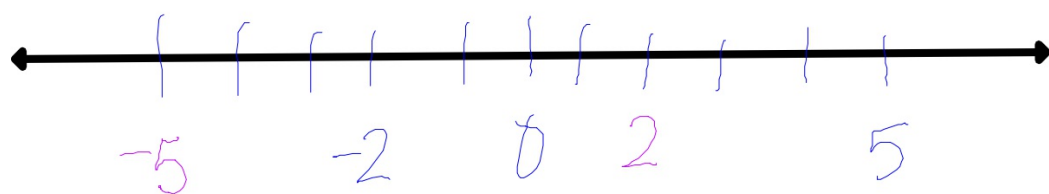
$x = \text{unknown \#}$

$$5x \geq 3$$

$$x \geq \frac{3}{5}$$

$$8 + x > 2$$

$$x > -6$$



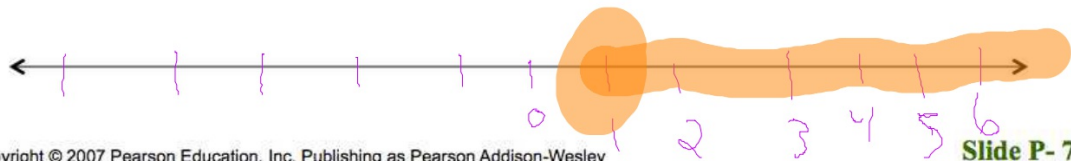
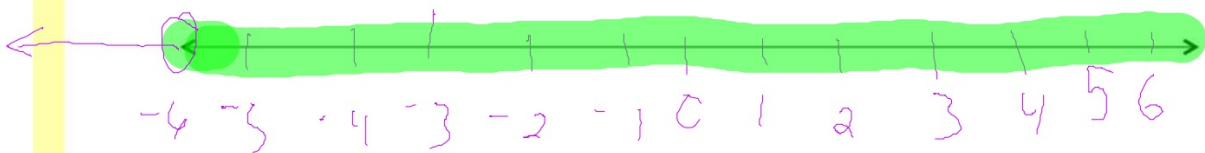
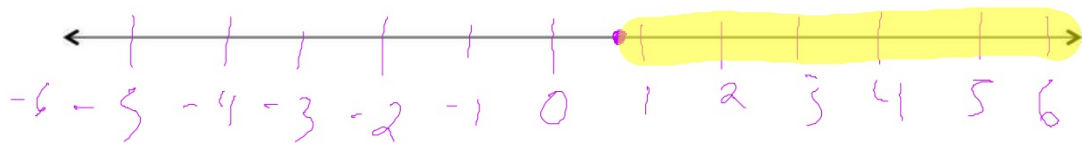
Using a graph to solve

$$x \geq \frac{3}{5}$$

0.6

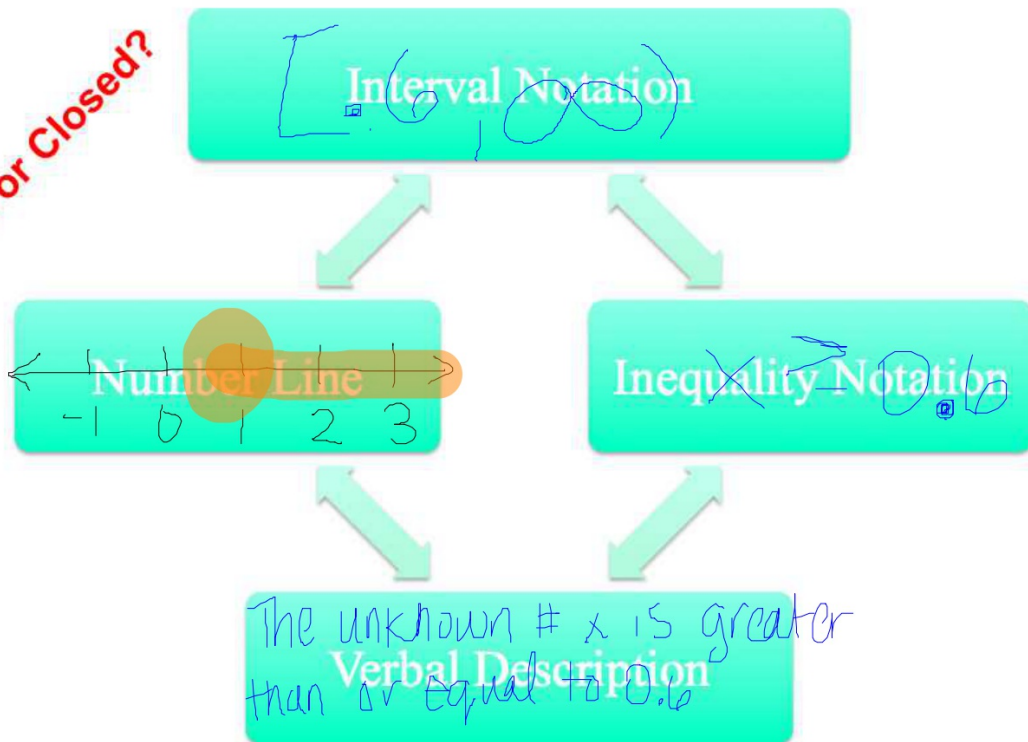
and

$$x > -6$$



Equivalent Representations for Intervals of Real Numbers

Open or Closed?



AM OBJ: WP: Linear Inequalities

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

$$P = 2l + 2w$$

*

$l = \text{length.}$

$$2l + 2w \geq 392$$

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

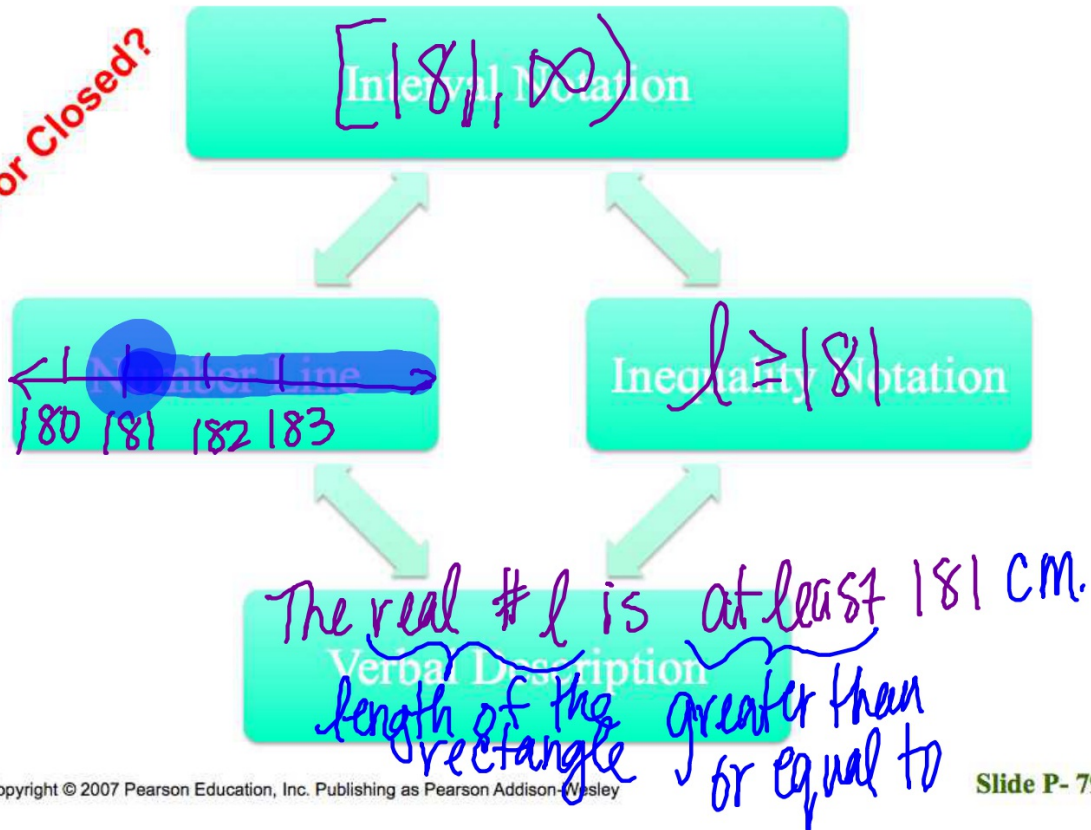
$$\begin{array}{r} -30 \quad -30 \\ \hline \end{array}$$

$$l \geq 181$$

$$\begin{array}{r} 2l \geq 362 \\ \hline 2 \quad 2 \end{array}$$

Equivalent Representations for Intervals of Real Numbers

Open or Closed?



the set of x such that x is an element of the real #s and x is greater than or equal to $|8|$.

$\{x \mid x \in \mathbb{R}, x \geq |8|\}$ 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.

$$17 \leq 4w \leq 56 \quad [A] \quad 4.25 \leq x \leq 14$$

$$P = 4w$$

$w = \text{width of square}$

$$[B] \quad 8.5 \leq x \text{ and } x \leq 28$$

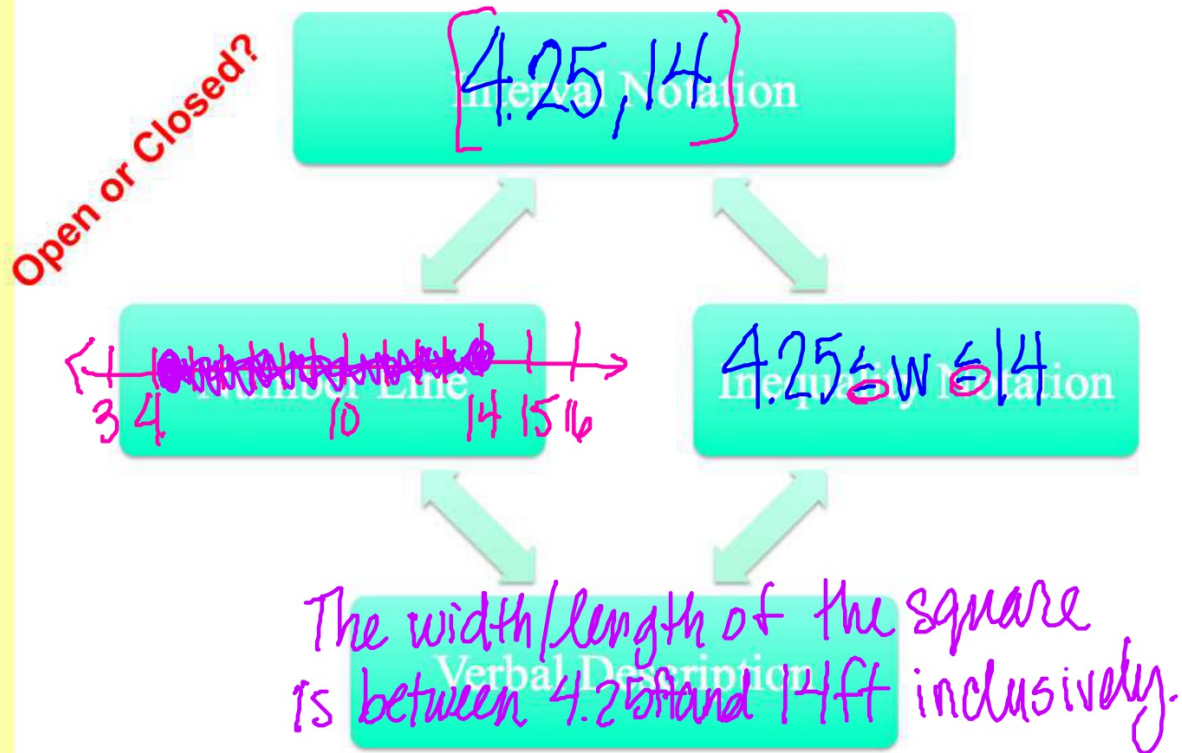
$$[C] \quad 4.25 \leq x \leq 52$$

$$[D] \quad 8.5 < x < 28$$

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

$$4.25 \leq w \leq 14$$

Equivalent Representations for Intervals of Real Numbers



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.

$$5(x-19) \geq 155 \quad [A] \quad x \leq 50$$

$$5x - 95 \geq 155 \quad [B] \quad x \leq 12$$

$$[C] \quad x \geq 12$$

$$[D] \quad x \geq 50$$