7. 7 Solving Inequalities Using Multiplication or Division

ESSENTIAL QUESTION: How can you use multiplication or division to solve an inequality?

SOLVING INEQUALITIES USING MULTIPLICATION AND DIVISION

1) Get _variable_ by itself by either multiplying or dividing on _both_ _sides_ just like you were solving an _equation_

2) Answer will have a _variable_, _inequality sign_, and a _number_.

3) Graph your solution on a _number_ _line_.
   * < or > is an _open_ circle
   * ≤ or ≥ is a _closed_ circle

EXAMPLE 1 -> Solve an Inequality Using Multiplication
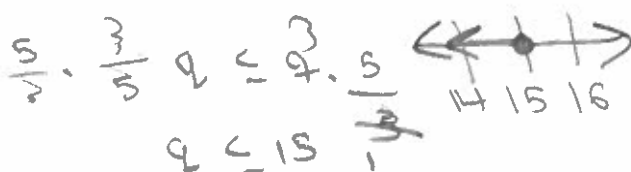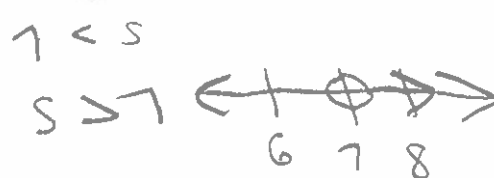Solve the inequality. Graph the solution.

1) $\frac{x}{5} \leq 2 \cdot 5$

$x \leq 10$

9 10 11

2) $p \div 3 > 2$

$3 \cdot \frac{p}{3} > 2 \cdot 3$

$p > 6$

5 6 7

3) $\frac{3}{5}q \leq 9$

$\frac{5}{3} \cdot \frac{3}{5}q \leq 9 \cdot \frac{5}{3}$

$q \leq 15$

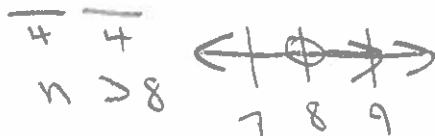14 15 16

4) $1 < \frac{s}{7}$

$7 < s$

$s > 7$

6 7 8

EXAMPLE 2 -> Solve an Inequality Using Division
Solve the inequality. Graph the solution.

1) $4n > 32$

$\frac{4}{4}$ $\frac{32}{4}$

$n > 8$

7 8 9

2) $11k \leq 33$

$\frac{11}{11}$ $\frac{33}{11}$

$k \leq 3$

2 3 4

3) $5 \cdot j > 20$

$\frac{5}{5}$ $\frac{20}{5}$

$j > 4$

3 4 5

4) $50 \leq 2m$

$\frac{50}{2}$ $\frac{2}{2}$

$25 \leq m$

$m \geq 25$

24 25 26
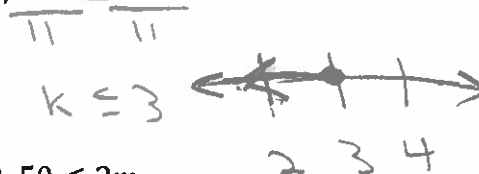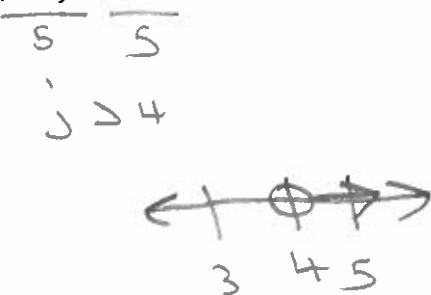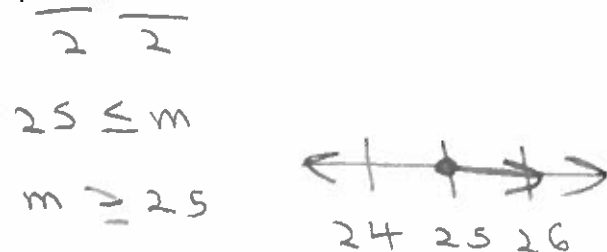
<u>EXAMPLE 3->Real Life Application</u>
1)A one-way bus ride costs $1.75.   A 30-day bus pass cost $42.

a)Write and solve an inequality to find the least number of one-way
   rides you must take for the 30-day pass to be a better deal.

$$\frac{1.75r}{1.75} > \frac{42}{1.75}$$

You need to take more than 24 1-way rides for the pass to be a better deal

$$r > 24$$

b) You ride the bus an average of 20 times each month.
   Is the pass a better deal? Explain

No. The cost of 20 1-way rides is less than $42.

2)The sign shows the toll for driving on Alligator Alley. Write and solve an inequality to represent the number of times someone can drive on Alligator Alley with $15.

$$\frac{2.5x}{2.5} \leq \frac{15}{2.5}$$

$$x \leq 6$$

The most someone can drive on Alligator Alley is 6 times.

Passenger Cars
Toll $2.50