Multiplying and Dividing Inequalities by Negative Numbers

Name: KEY PER Class: _____

Let's think about what makes sense:

True or False? $1 < 5$ $(\cdot -1)$

Now, multiply each side by -1.

True or False? $-1 < -5$

If this is false, what would we have to change to make it true?

$-1 \underline{>} -5$

True or False? $-3 > -8$ $(\cdot -2)$

Now, multiply each side by -2.

True or False? $6 > 16$

If this is false, what would we have to change to make it true?

$6 \underline{<} 16$

True or False? $10 < 25$

Now, divide each side by -5. $\frac{}{-5} \quad \frac{}{-5}$

True or False? $-2 < -5$

If this is false, what would we have to change to make it true?

$-2 \underline{>} -5$

What do you notice? What happens each time we multiply or divide by a negative number? The inequality is false and we need to change the inequality direction

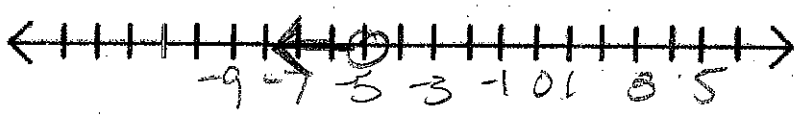
Solving and graphing by multiplying or dividing with negatives:

Examples:

1. $-5n > 25$

$\frac{-5}{-5} \quad \frac{}{-5}$

$n < -5$



Check: $n = -10$

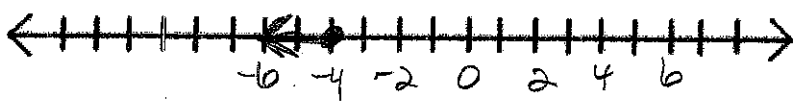
$-5(-10) > 25$

$50 > 25$

2. $64 \leq -16m$

$\frac{}{-16} \quad \frac{}{-16}$

$-4 \geq m$



Check: $m = -10$

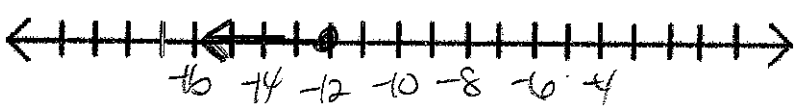
$64 \leq -16(-4)$

$64 \leq 100$

3. $-\frac{3}{4}x \geq 9$

$\frac{-4}{3} \quad x \leq -4/3$

$x \leq -12$



Check: let $x = -16$

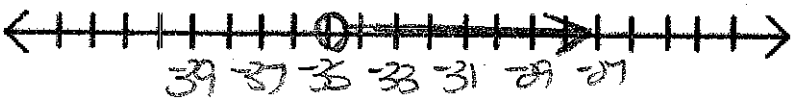
$\frac{-3}{4} \cdot \frac{-16}{1} \geq 9$

$12 \geq 9$

4. $7 > \frac{-k}{7} < 5 \cdot 7$

$\frac{-k}{-1} < \frac{35}{-1}$

$k > -35$



Check: let $k = -28$

$\frac{(-28)}{7} < 5$

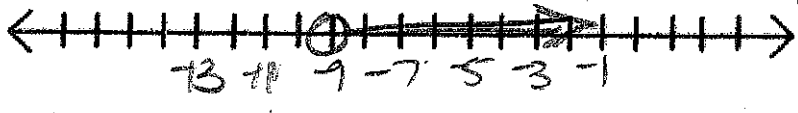
$4 < 5$

Try these:

5. $-6n < 54$

$\frac{}{-6} \quad \frac{}{-6}$

$n > -9$



Check: $n = 0$

$6(0) < 54$

$0 < 54$

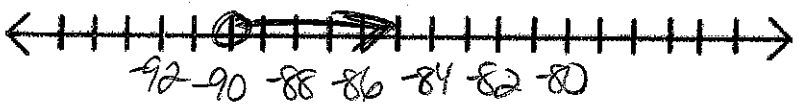
6. $81 > -0.9y$

$90.$

$9\overline{)810}$

$\frac{}{-0.9} \quad \frac{}{-0.9}$

$-90 < y$



Check: $y = 0$

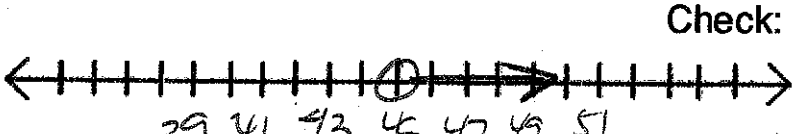
$81 > -.9(0)$

$81 > 0$

7. $3 > \frac{-p}{3} < -15 \cdot -3$

$\frac{-p}{-1} < \frac{-45}{-1}$

$p > 45$



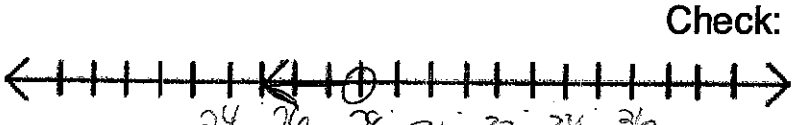
Check: let $p = 60$

$\frac{-60}{3} < -15$

$-20 < -15$

8. $4 > -\frac{h}{4} > -7 \cdot 4$

$h < 28$



Check: $h = 0$

$-\frac{0}{4} > -7$

$0 > -7$