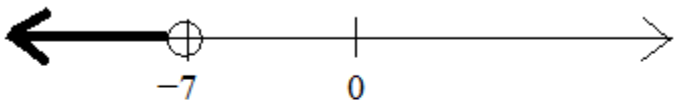
One Variable Inequalities & the Number Line

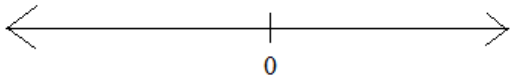


$x < -7$

Inequality & number line quiz I

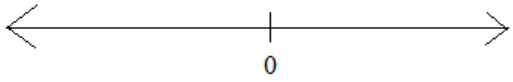
1) Solve and graph:

$2x + 8 \leq 14$



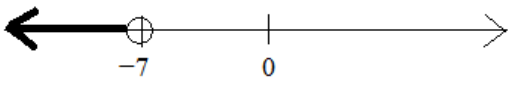
2) Solve and graph:

$-3y - 6 > 15$

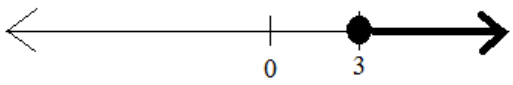


3) Describe the graphs:

a)

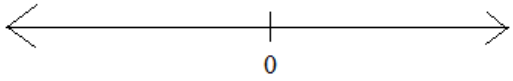


b)



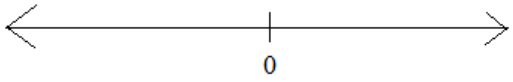
4) Solve and graph:

$\frac{w}{7} + 4 \leq -3$



5) Solve and graph:

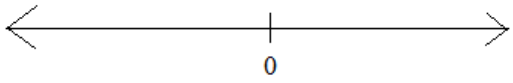
$3x + 11 = 14$



Inequality & number line quiz II

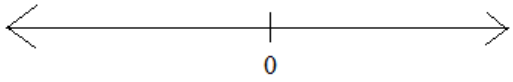
1) Solve and graph:

$3x - 6 < 9$



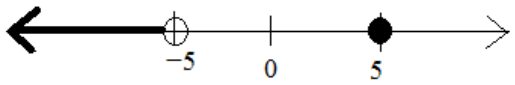
2) Solve and graph:

$\frac{w}{-6} \geq 4$

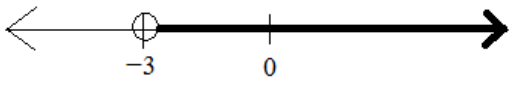


3) Describe the graphs:

a)

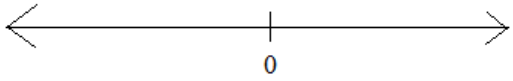


b)



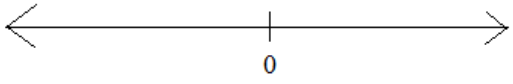
4) Solve and graph:

$\frac{x}{.1} + 2.1 > 4.4$



5) Solve and graph:

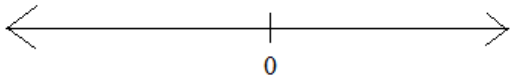
$2y + 6y < 24$



Inequality & number line quiz III

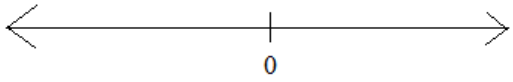
1) Solve and graph:

$2x + 11 \leq 21$



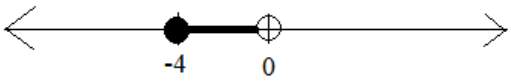
2) Solve and graph:

$\frac{y}{3} + 4 \leq 1$

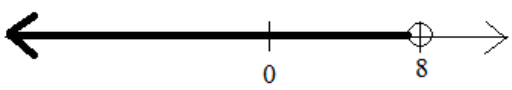


3) Describe the graphs:

a)

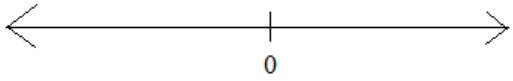


b)



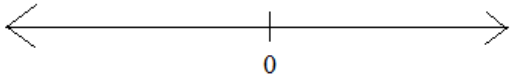
4) Solve and graph:

$\frac{5m}{7} + 5 > 15$



5) Solve and graph:

$8x - 13x < 30$



Solve each question (with an inequality equation).
Then, graph on the number line.

Inequality Word Problems

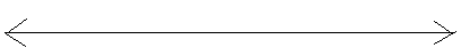
1) Gus wants me to add gas to his car. He told me that I must add more than 2 gallons.
If I have $20 and gas costs $2.50 per gallon, how many gallons can I add?

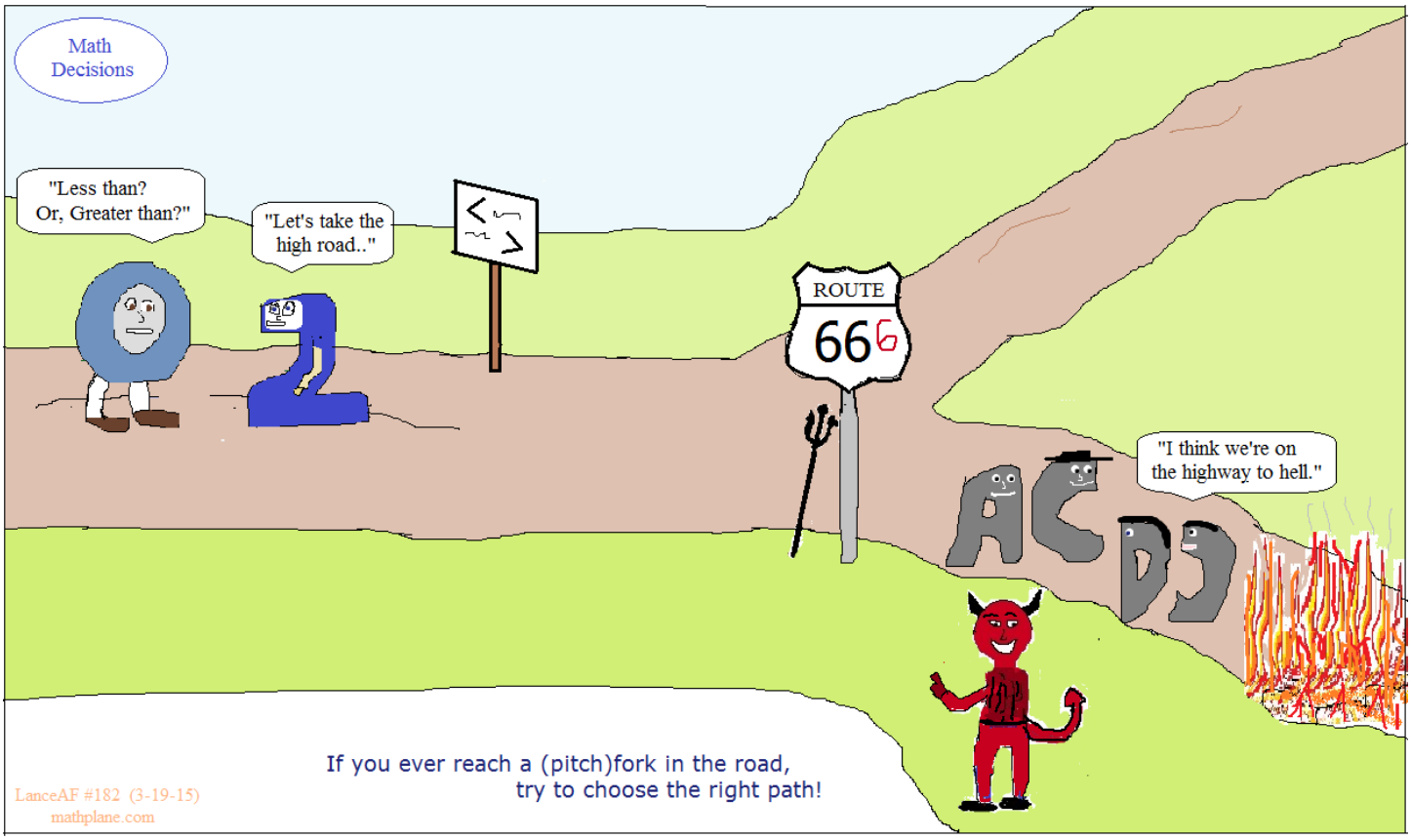
2) Sam works between 10 and 35 hours per week at the math store.
If he earns $12 per hour, what is his income each week?

3) John Appleseed has $10.50 in his pocket.
If apples cost .75 per pound, write an inequality showing
the amount of apples he can afford to buy.

4) In Homer's house, the air conditioner goes on if the temperature is above 88 degrees.
And, if the temperature is below 60 degrees, the heater turns on.
At what temperatures do the heating/cooling units run?

5) In Julie's room there are 3 bookshelves, each with length 4 feet.
If each shelf has at least 18 books, between 2 and 3 inches,
how many possible books does she have?




Math Decisions
"Less than? Or, Greater than?"
"Let's take the high road.."
ROUTE
666
"I think we're on the highway to hell."
If you ever reach a (pitch)fork in the road, try to choose the right path!
LanceAF #182 (3-19-15)
mathplane.com

SOLUTIONS-→

Inequality & number line quiz I

< "open circle"
≤ "closed circle"

SOLUTIONS

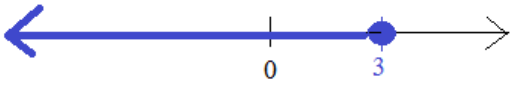
1) Solve and graph:

$2x + 8 \leq 14$

$-8 \quad -8$ subtract 8

$\frac{2x}{2} \leq \frac{6}{2}$ divide by 2

$x \leq 3$



To check: test $x = 0$

$2(0) + 8 \leq 14$

$8 \leq 14$ ✓

2) Solve and graph:

$-3y - 6 > 15$

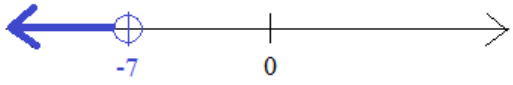
$+6 \quad +6$ add 6

$\frac{-3y}{-3} > \frac{21}{-3}$ divide by -3

$y < \text{ or } > -7?$

$y < -7$

Note: because you divided by a negative, the sign flips!



To check: test $y = 0$

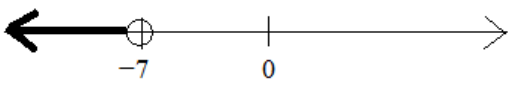
$-3(0) - 6 > 15$

$-6 > 15$ ✗

0 is NOT a solution...

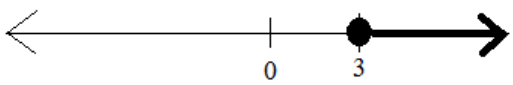
3) Describe the graphs:

a)



$x < -7$

b)



$x \geq 3$

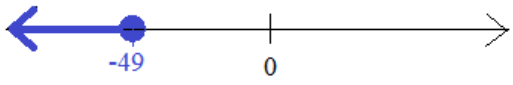
4) Solve and graph:

$\frac{w}{7} + 4 \leq -3$ subtract 4

$\frac{w}{7} = -7$ then, multiply by 7

$w = -49$

$w \leq -49$



then, test $w = 0$

$\frac{(0)}{7} + 4 \leq -3$

$4 \leq -3$

0 is NOT a solution, so the arrow goes to the left...

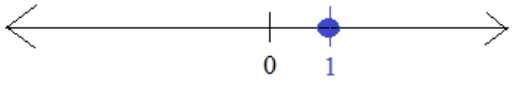
5) Solve and graph:

$3x + 11 = 14$

$-11 \quad -11$

$\frac{3x}{3} = \frac{3}{3}$

$x = 1$



Inequality & number line quiz II

SOLUTIONS

1) Solve and graph:

$3x - 6 < 9$

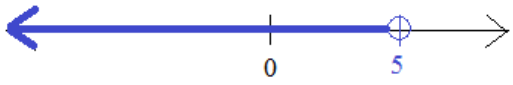
$+6 \quad +6$

$\frac{3x}{3} < \frac{15}{3}$

add 6 to both sides

divide by 3

$x < 5$

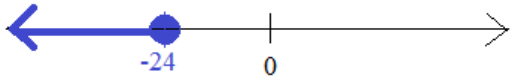


2) Solve and graph:

$\frac{w}{-6} \geq 4$

multiply both sides by -6

$w \leq -24$



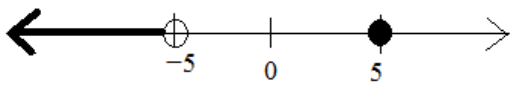
$w \geq$ or ≤ -24 ??? ⟶ test w = 0:

$\frac{0}{-6} \geq 4$ $\quad 0 \geq 4$ NO

The shaded part of the number line does NOT include 0...

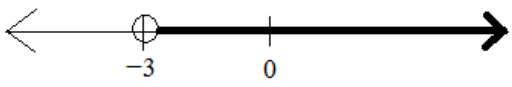
3) Describe the graphs:

a)



$x < -5$ or $x = 5$

b)



$x > -3$

4) Solve and graph:

$\frac{x}{.1} + 2.1 > 4.4$

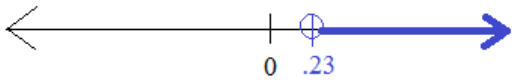
$\frac{x}{.1} > 2.3$

$x > (2.3)(.1)$

subtract 2.1 from both sides..

multiply by .1

$x > .23$



5) Solve and graph:

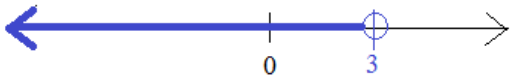
$2y + 6y < 24$

$8y < 24$

$y < 3$

collect "like" terms

divide by 8



Inequality & number line quiz III

< "open circle"
≤ "closed circle"

SOLUTIONS

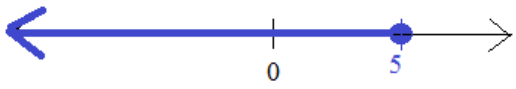
1) Solve and graph:

$2x + 11 \leq 21$

$-11 \quad -11$ subtract 11

$\frac{2x}{2} \leq \frac{10}{2}$ divide by 2

$x \leq 5$

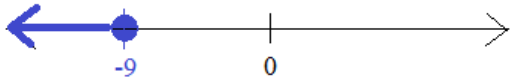


2) Solve and graph:

$\frac{y}{3} + 4 \leq 1$ subtract 4

$\frac{y}{3} \leq -3$ multiply by 3

$y \leq -9$



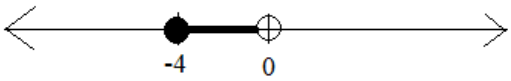
Quick check: let y = 0 $\frac{0}{3} + 4 \leq 1$

$4 \leq 1$

0 is NOT a solution (so, the arrow goes to the left)

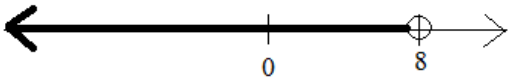
3) Describe the graphs:

a)



$-4 \leq x < 0$

b)



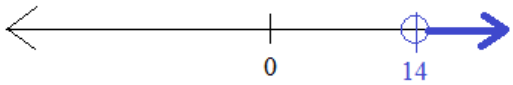
$x < 8$

4) Solve and graph:

$\frac{5m}{7} + 5 > 15$

$\frac{5m}{7} > 10$ subtract 5 from both sides

$m > 14$ multiply $\frac{7}{5}$ to both sides



$\frac{7}{5} \cdot \frac{5}{7} = 1$

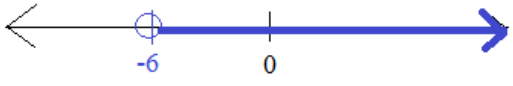
$\frac{7}{5} \cdot 10 = 70/5 = 14$

5) Solve and graph:

$8x - 13x < 30$ collect "like" terms

$\frac{-5x}{-5} < \frac{30}{-5}$ divide both sides by -5

$x > -6$ ***Remember to flip the sign!



$x > -6$

Quick check: test x = 0 $8(0) - 13(0) < 30$

$0 - 0 < 30$ ✓

Solve each question (with an inequality equation).
Then, graph on the number line.

SOLUTIONS

Inequality Word Problems

1) Gus wants me to add gas to his car. He told me that I must add more than 2 gallons. If I have $20 and gas costs $2.50 per gallon, how many gallons can I add?

Let g = gallons of gas

Since I must add more than 2 gallons, $g > 2$

Then, since I have $20 and gas costs $2.50/gallon, I can buy up to 8 gallons of gas

$2 < g \leq 8$

2) Sam works between 10 and 35 hours per week at the math store. If he earns $12 per hour, what is his income each week?

Let i = income per week

We know that i = $12 x (hours)

$10 \leq$ hours ≤ 35

multiply by $12...

$\$120 \leq i \leq \$420$

3) John Appleseed has $10.50 in his pocket. If apples cost .75 per pound, write an inequality showing the amount of apples he can afford to buy.

If John has $10.50 and apples cost $.75,

then, $\$.75/\text{pound} \cdot (p) \leq \$10.50$

where p = # of pounds of apples

$p \leq 14$

Then, since apples cannot be negative,

$p \geq 0$

$0 \leq p \leq 14$

4) In Homer's house, the air conditioner goes on if the temperature is above 88 degrees. And, if the temperature is below 60 degrees, the heater turns on. At what temperatures do the heating/cooling units run?

Let t = temperature of Homer's house

$t > 88$ (air conditioner runs)

$t < 60$ (heating unit runs)

$t < 60$ or $t > 88$

Note: In reality, the temperatures can't extend forever for 2 reasons...

1) If the temp goes over 88 (or under 60), the unit turns on --- and, the temperature returns to the desired range..

2) If the temperature was 1000 degrees, everything would melt... Or, if the temperature was under -500 degrees, everything would be frozen!

5) In Julie's room there are 3 bookshelves, each with length 4 feet. If each shelf has at least 18 books, between 2 and 3 inches, how many possible books does she have?

Looking at 1 bookshelf:

The minimum number of books is 18...

Then,

4 feet long x 12 inches/foot = 48 inches...

Assuming each book is only 2 inches, then the maximum number of books is 24...

Therefore, for 3 bookshelves, $b \geq 54$ and $b \leq 72$

$54 \leq b \leq 72$

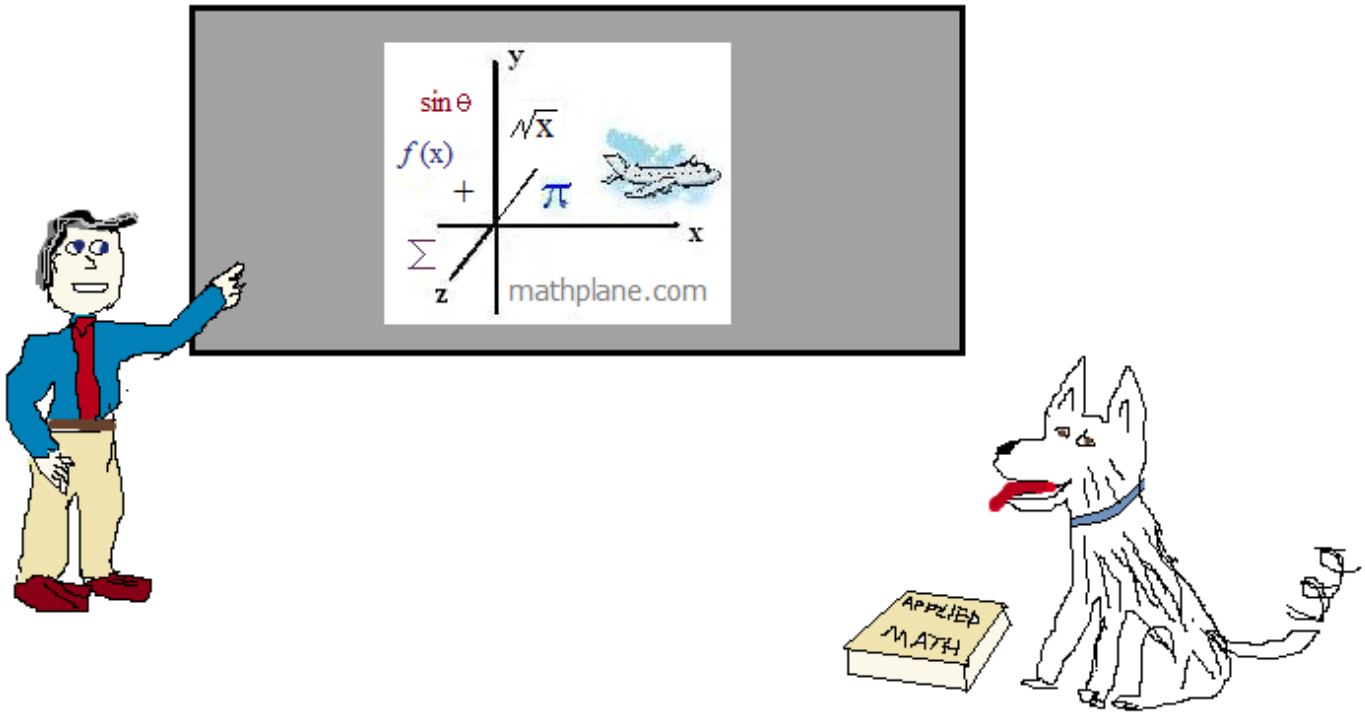
where b = number of books and b is an integer

since each is a single book, we only mark the integers on the number line..

Thanks for visiting. (Hope it helped!)

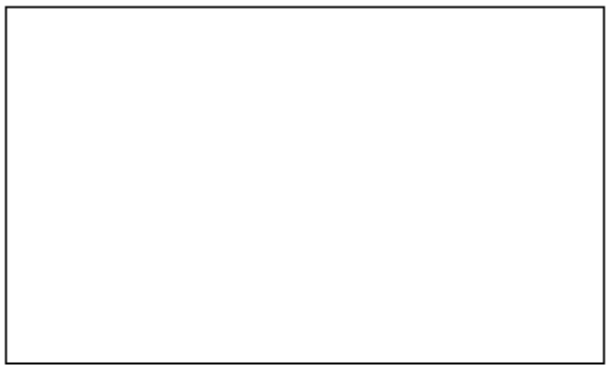
If you have questions, suggestions, or requests, let us know.

Cheers



Also, at Facebook, Google+, TES, TeachersPayTeachers, and Pinterest

Mathplane *Express* for mobile and tablets at Mathplane.org



If the perimeter of this rectangle is less than 100 units, write an inequality that describes the possible values of x.

If the perimeter of this rectangle is less than 100 units, write an inequality that describes the possible values of x.

SOLUTION

Perimeter = 2(length) + 2(width)

$2(8x) + 2(2x - 3) < 100$

$16x + 4x - 6 < 100$

$20x < 106$

$x < 5.3$

THEN, we know length/width cannot be 0 or negative!

So, $8x > 0$ and $2x - 3 > 0$

$x > 0$ AND $x > 1.5$

Therefore, the possible values (i.e. restrictions) of x:

$1.5 < x < 5.3$