Essential Question: How can we model situations using inequalities?

Do Now:

Students at Roslyn Middle School are having a car wash in order to raise money. They need to raise at least $300 for disaster relief work. They have estimated their profit per car is $7. How many cars must they wash to meet their fundraising goal?

x = number of cars

$\frac{7x}{7} \geq \frac{300}{7}$

$x \geq 42.857...$

At least 43 cars

Inequality Words

What words translate into what inequality symbols?

is more than is greater than must exceed	Boston is more than 200 miles away New York's population is greater than Rhode Island's population The speed must exceed 15 mph	$>$
is less than	Spot's weight is less than 50 lbs	$<$
is less than or equal to is at most/maximum cannot exceed	Sam's test score is less than or equal to mine At most, 5 students dropped the course Earnings cannot exceed $1200	$\leq$
is greater than or equal to is at least/minimum	My quarter average is greater than or equal to yours Bring at least $10 to the movies	$\geq$

When solving "word problems"...

1) Define all unknowns algebraically
2) Use key words in the problem to set up an inequality relating all unknowns
3) Solve the inequality
4) Answer the question and make sure your answer is complete, reasonable and makes sense

Modeling Situations with Inequality Statements

1. Lior and Ella volunteer at an animal shelter. Ella worked 3 more hours than Lior. Together they worked more than 27 hours. What is the least number of *whole number* hours each person worked?

x = number of hrs Lior worked 13

$x+3$ = number of hrs Ella worked 16

$$x + x + 3 > 27$$
$$2x + 3 > 27$$
$$2x > 24$$
$$x > 12$$

2. A taxi charges an initial fee of \$6.00 and \$0.70 for each mile. How far can a person travel before the cost exceeds \$13.00?

x = number of miles 10

$$6 + .7x \leq 13$$
$$.7x \leq 7$$
$$x \leq 10$$

3. Tacky Times charges \$2500 plus \$45 per person for a party. Perfect Party charges \$3200 plus \$40 per person. How many people must attend a party for Perfect Party to be less expensive?

x = number of people 141

P.P. < T.T.

$$3200 + 40x < 2500 + 45x$$
$$3200 - 5x < 2500$$
$$-5x < -700$$
$$x > 140$$

4. A checking account is set up with an initial balance of \$9400, and \$800 is removed from the account at the end of each month for rent (no other transactions occur on the account).

   (a) Write and solve an inequality to represent the number of months, m, in which the account balance is greater than \$3000.

   (b) What is the greatest number of months for which the balance exceeds \$3,000?

7 mo.

$$9400 - 800m > 3000$$
$$-800m > -6400$$
$$m < 8$$

The TAKEAWAY

When solving inequality word problems, check to see if your answer makes sense given the context of the problem.