LEARNING OBJECTIVE: We will interpret solutions to inequalities and solve inequality statements. (G7M3L11)

CONCEPT DEVELOPMENT:
An **inequality** is a statement that one expression is less than (or equal to) or greater than (or equal to) another expression.
Examples:

$2x + 3 < 15$ ← *If $x = 3$ the inequality is true*
$3x + 50 \leq 100$ ← *If $x = 10$ the inequality is NOT true.*

$5x+7\leq22,$ $5x + 6 \leq 30,$ $3x + 4 \leq 19$
A **solution to an inequality** is a number that makes the inequality true.

Writing Inequalities statements requires careful reading and thinking.
Eric is trying to save $265.49 to buy a new camera. Right now he has $40 and can save $38 a week from allowance and odd jobs. Write an inequality to represent this situation.

# of weeks Eric has saved (w)	Amount of money Eric has	Is this more or less than $265.49?	Can he buy the camera?
	$40 + 38w \geq 265.49$		
3	$40 + 38(3) = 40+114 = 154$	$154 < 265.49$	NO
4	$40 + 38(4) = 40 + 152 = 192$	$192 < 265.49$	NO
5	$40 + 38(5) = 40 +190 = 230$	$230 < 265.49$	NO
6	$40 + 38(6) = 40 +228 = 268$	$268 > 265.49$	YES
7	$40 + 38(7) = 40 +266 = 306$	$306 > 265.49$	YES
8	$40 + 38(8) = 40 +304 = 344$	$344 > 265.49$	YES

What inequality sign do we want to use for this inequality statement? Why?

greater than or equal to. $\geq$ He needs
AT LEAST $265.49 to buy the camera

Write the inequality statement:

Guided Practice:

Steps for Solving Inequalities
1. Read the problem carefully and write an inequality that describes the situation.
2. Perform if-then moves to solve the inequality.
3. Interpret your answer in the context of the problem.

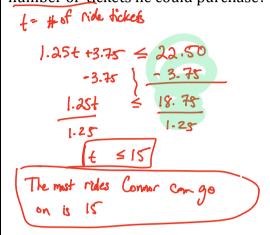|	
Gus had $300 in birthday money. He spent $199 on new Beats headphones and wanted to download music from iTunes with the rest of his money. Each song cost $1.29 to download. Does he have enough money to download 60 songs? What about 75 songs?	You are taking a very strange test, where each correct question answered is worth 4.5 points. In order to pass, you need to get 77 points. If you show up and print your name, you get an automatic 10 points. Will you pass the test if you print your name and get 12 questions correct? What about 16 questions?

let $s = $ # of songs

$199 + 1.29 s \leq 300$

$199 + 1.29(60) \leq 300$ Gus can download 75 songs

$199 + 77.40 \leq 300$

$276.40 \leq 300$

$199 + 1.29(75) \leq 300$
$199 + 96.75 \leq 300$
$295.75 \leq 300$

let $q = $ # questions correct.

$10 + 4.5q \geq 77$

$10 + 4.5(12) \geq 77$
$10 + 54 \geq 77$
$64 \geq 77$ No Pass!

$10 + 4.5(16) \geq 77$
$10 + 72 \geq 77$ Pass!!

Refer to Gus' birthday question above. What is the maximum number of songs he can download?	Refer to the question above. What is the minimum number of questions you need to get right in order to pass this test?

$199 + 1.29s \leq 300$
$-199 \qquad\qquad -199$

$\dfrac{1.29s}{1.29} \leq \dfrac{101}{1.29}$

$s \leq 78$

$10 + 4.5q \geq 77$
$-10 \qquad\qquad -10$

$\dfrac{4.5q}{4.5} \geq \dfrac{67}{4.5}$

$q \geq 14.\overline{8}$

You need to get 15 questions correct to pass

Connor went to a local fair. He had $22.50 in his pocket. He spent $3.75 on a hotdog and then wanted to spend the rest of his money on ride tickets that cost $1.25 each. What is the maximum number of tickets he could purchase?

$t = \#$ of ride tickets

$$1.25t + 3.75 \leq 22.50$$
$$-3.75 \qquad -3.75$$
$$\frac{1.25t}{1.25} \leq \frac{18.75}{1.25}$$
$$\boxed{t \leq 15}$$

The most rides Connor can go on is 15

Joe bought a table saw at Home Depot for $200. He has $350 total to spend there and wanted to make crates for his records...the wood for each crate cost $23. How many crates could he make?

$c = \#$ of crates

Can't spend more than $350

$$200 + 23c \leq 350$$
$$-200 \qquad -200$$
$$\frac{23c}{23} \leq \frac{150}{23}$$
$$c \leq 6.52$$

I can make 6 crates with my $.

Starbucks sells a special mug every holiday season that entitles the coffee drinker to free coffee every day for the month of January. They claim "it's a $75 value." At least how many cups of coffee would you have to drink to make their claim ring true if each cup of coffee cost $2.10 and the mug regularly costs $15?

$c = \#$ of cups of coffee

$$2.10c + 15 \geq 75$$
$$-15 \qquad -15$$
$$\frac{2.10c}{2.10} \geq \frac{60}{2.10}$$
$$c \geq 28.57$$

You need to drink at least 29 cups of coffee to make it worth $75

A regular membership at Costco is $55 annually, but the executive membership is $100. One of the perks with the executive membership is that you get 2% discount on everything you purchase. What would you have to spend in order to make the upgraded membership pay for itself (i.e. save the difference in cost for the upgraded membership)?

Let $x = \$$ you spend at Costco.

$$55 + .02x \geq 100$$
$$-55 \qquad\qquad -55$$
$$\frac{.02x}{.02} \geq \frac{45}{.02}$$
$$x \geq 2,250$$

You need to spend $2,250 to make it worth it.

You are selling brownies for $1.50 each for a fundraiser. The cost of the supplies (flour, sugar, chocolate, etc) was $23.54. How many brownies do you need to sell in order to make a profit of at least $45.00?	Games at a carnival cost $3 each. The prizes that were awarded to the winners cost $146. How many games must be played for the carnival to make at least $50 in profit?
Flor has $500 in her bank account. Every week she withdraws $40 from her account. How many weeks can she withdraw the money if she wants her account balance to remain above $200? let w = #of weeks $500 - 40w \geq 200$ $-500 \qquad -500$ $\dfrac{-40w}{-40} \geq \dfrac{-300}{-40}$ $\boxed{w \leq 7.5}$ SWITCH INEQUALITY WHEN YOU DIVIDE BY NEGATIVE # She can withdraw $40 for at most 7 weeks	You received a $100 Amazon gift card.. Movies cost $2.99 to rent for 48 hours from Amazon Prime Video. How many movies could you rent from Amazon Prime Video and still have $25 left on your gift card? $2.99m + 25 \leq 100$ $100 - 2.99m \geq 25$

Independent Practice:

Activating Prior Knowledge:
We can interpret inequality statements.

$x \geq 6$	$x \leq -23$
The furthest I can drive my Leaf is 85 miles before I need to charge it. Write an inequality where *m* is the number of miles I can drive on a charge.	I am committed to replying to all emails at most within 48 hours of receiving them. Write an inequality where *h* is the number of hours that pass before I reply to emails.

Closure:
Gem is collecting donations for a dance marathon. Her dad's work friends say they will donate $6 for each hour she dances, and her grandparents commit to donating $75, no matter how long she dances. How many hours (to the nearest minute) does Gem need to dance if she wants to raise at least $500?

Teacher Notes:
Can combine lessons 13 and 14 from ENY grade 7 mod 3.
HW: Interpreting and Solving Linear Inequalities KHAN!