Algebra 1: 2.3 Homework – Day 3 **Name**_____ **Period**_____
Modeling Linear Inequalities

↓ starting point

Chang-Ho is going on a trip to visit some friends from summer camp. He will use $40 for food and entertainment. He will also need money to cover the cost of gas. The price of gas at the time of his trip is $3.25 per gallon.

↑ rate of change

1. Consider a function in the form $C(g)$ to represent this problem situation.

   a. Write a function to represent the total cost of the trip as a function of the number of gallons used.

   $C(g) = 3.25g + 40$

   b. Identify the independent and dependent quantities and their units.

   IQ (or g) = # of gallons used
   DQ (or f(g)) = total cost of the trip

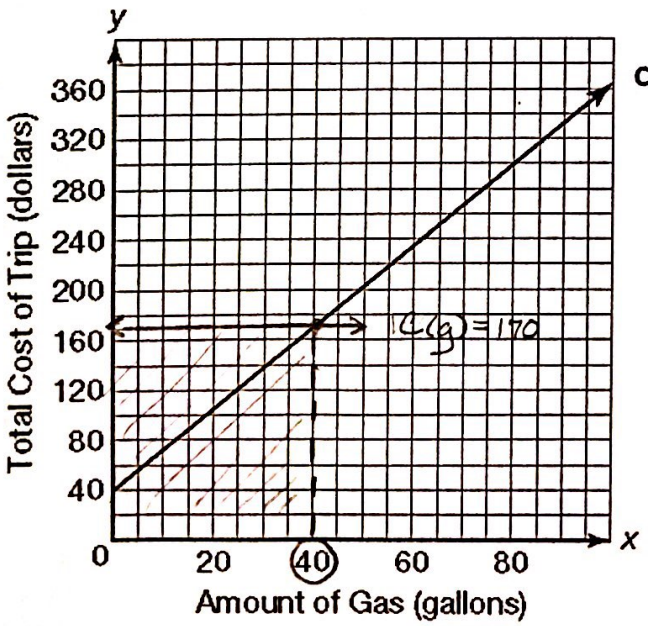
   $ROC = \frac{DQ}{IQ}$

   c. Identify the rate of change and the *y*-intercept. Explain their meanings in terms of the problem situation.

   ROC = 3.25/1 gallon of gas
   Each gallon of gas costs $3.25
   starting point or y-intercept = 40
   Chang-Ho starts his trip with $40.

   d. Below is the graph of the function representing this situation on the coordinate plane.

   - Use the graph to determine how many gallons of gas Chang-Ho can buy if he has $170 saved for the trip.
   - Draw an ~~oval~~ box on the graph to represent the solution.
   - Then, write your answer in words and as an inequality.



C(g) = 3.25g + 40

Remember, the box represents < or ≤.

$g \leq 40$

Chang-Ho can buy 40 gallons of gas or less.

e. Now that you solved the problem graphically, check your solution by solving it algebraically. Write the function as an inequality. Use this inequality to determine the how many gallons of gas Chang-Ho can buy if he has $170 saved for the trip.

$3.25g + 40 \leq 170$

$-40 \quad -40$

$\frac{3.25g}{3.25} \leq \frac{130}{3.25}$

$g \leq 40$

f. Chang-Ho's mom gives him some money for his trip. He now has a total of $220 saved for the trip. What is the greatest number of gallons of gas he can buy before he runs out of money? Write and solve an inequality. Then, graph your solution on the number line.

$3.25g + 40 \leq 220$

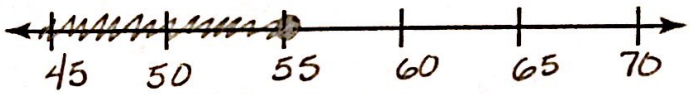
$-40 \quad -40$

$\frac{3.25g}{3.25} \leq \frac{180}{3.25}$

$g \leq 55.38$

Round down! ≈ 55

Chang-Ho can buy no more than 55 gallons of gas.



g. If Chang-Ho spent more than $92 on his trip, how much gas could he have bought? Write and solve an inequality. Then, graph your solution on the number line.

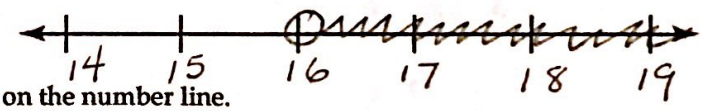
$3.25g + 40 > 92$

$-40 \quad -40$

$\frac{3.25g}{3.25} > \frac{52}{3.25}$

$g > 16$

Chang-Ho could have bought more than 16 gallons of gas.



2. Solve the following inequalities and graph your solution on the number line.

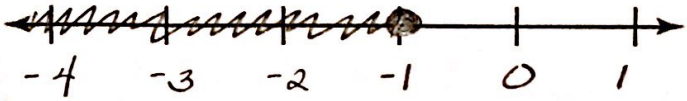
a. $2(x+6) \leq 10$

$2x + 12 \leq 10$

$-12 \quad -12$

$\frac{2x}{2} \leq \frac{-2}{2}$

$x \leq -1$



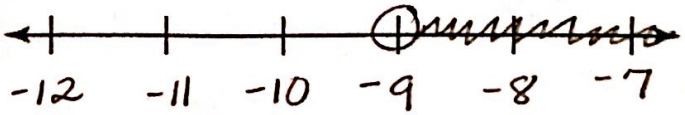
b. $32 > 23 - x$

$-23 \quad -23$

$\frac{9}{-1} > \frac{-x}{-1}$

Double Flip! $x > -9$

Flip the sign! $-9 < x$



c. $-7x - 4 > -2x + 16$

$+2x \quad +2x$

$-5x - 4 > 16$

$+4 \quad +4$

$\frac{-5x}{-5} > \frac{20}{-5}$

Flip the sign! $x < -4$