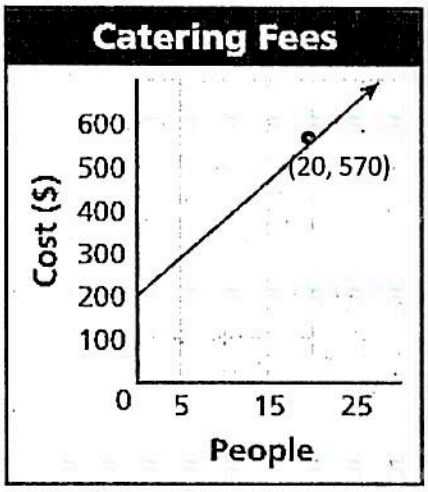
Algebra RH

Essential Question: How can we represent a linear relationship symbolically from a graph?

Do Now:

The graph pictured to the right shows the relationship between the fees charged by a catering company and the number of people served.



a) Calculate the rate of change and identify the y-intercept. Write an equation that represents the linear relationship.

ROC (x_1, y_1) $(0, 200)$ (x_2, y_2) $(20, 570)$ y int: 200

$\frac{\Delta y}{\Delta x} = \frac{200 - 570}{0 - 20} = \frac{-370}{-20} = 18.5$ $y = 18.5x + 200$

b) What is the meaning of the y-intercept and the rate of change in your equation?

y int: 200 people $ (0, 200)

The initial fee to host the event is $200.

ROC $\frac{18.5\ \$}{1\ \text{people}}$

The catering fee is $18.50 per person.

c) If you have $4,000, can you hold an event for 200 guests? Justify your response.

$y = 18.5x + 200$

$y = 18.5(200) + 200$

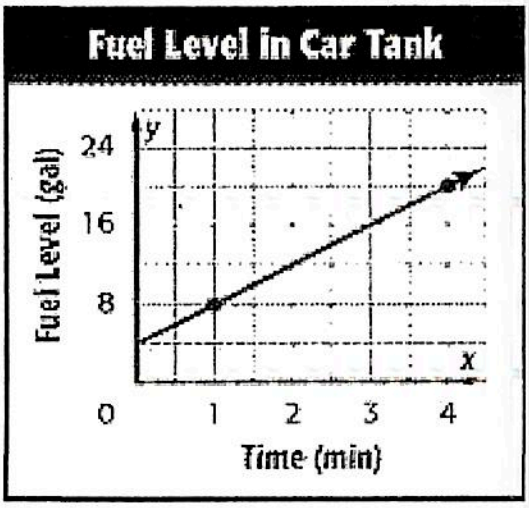
$y = 3900$

Yes, $4000 > 3900$

Think about this...

Linear relationships can be represented symbolically by creating an equation in two variables.

1) Write an equation to represent the linear relationship shown by the graph.
What does the y-intercept represent?
What does the rate of change represent?



y int = 4 min gallons $(0, 4)$

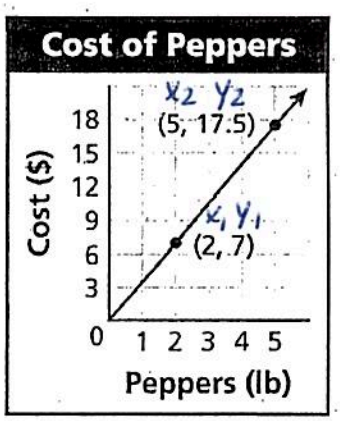
The initial amount of gas in the tank is 4 gallons.

ROC $\frac{\text{rise}}{\text{run}} = \frac{4 \text{ gallons}}{1 \text{ min}}$

The fuel level in the car tank is increasing at a rate of 4 gallons per minute.

equation → $y = 4x + 4$

2) Write an equation to represent the linear relationship shown by the graph. What does the y-intercept represent? What does the rate of change represent?



y int: 0
$ 1b
(0,0)

when you don't buy any peppers, you don't spend any money.

ROC

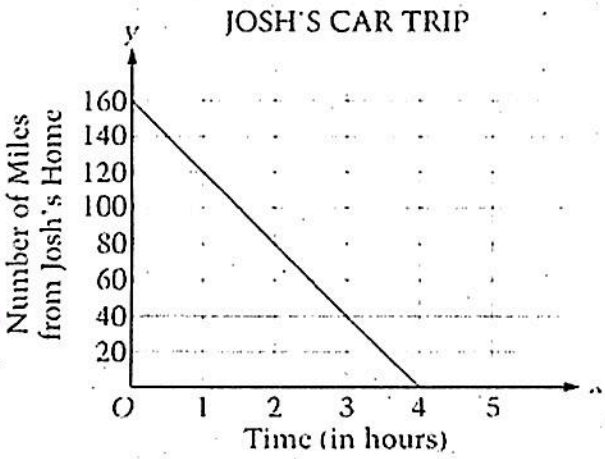
$\frac{\Delta y}{\Delta x} = \frac{17.5-7}{5-2} = \frac{10.5}{3} = \frac{3.5\ \$}{1\ lb}$

peppers cost $3.50 per pound

$y = 3.5x$

Interpreting X and Y-Intercepts of a Graph

3) The graph below shows the relationship between time and miles as Josh leaves his cousin's house to travel home.



a) Identify the y-intercept of the graph.
What does it tell us in the context of this situation?

y int: 160
hours miles from
(0, 160) home

At the start of his car trip (initially) Josh is 160 miles from home.

b) Identify the x-intercept of the graph.
What does it tell us in the context of this situation?

x int: 4
hours miles from
(4, 0) home

It takes Josh 4 hours to arrive home.

c) Use the intercepts to calculate the rate of change.
What does the rate of change tell us in the context of this situation?

ROC (x_1, y_1) $(0, 160)$ (x_2, y_2) $(4, 0)$

$\frac{\Delta y}{\Delta x} = \frac{160-0}{0-4} = \frac{160}{-4} = \frac{-40 \text{ miles from home}}{1 \text{ hours}}$

Josh is 40 miles less away from home (closer to home) every hour.

d) Write an equation that represents the linear relationship shown by the graph.

$y = -40x + 160$

e) Using your equation, determine how long Josh has been driving when he is 52 miles from home.

$y = -40x + 160$

$52 = -40x + 160$

$-108 = -40x$

$2.7 = x$

.7 x 60 = 48 minutes
Josh has been driving for 2 hours and 48 minutes.