Guided Notes 7.1: Modeling Linear Relationships

A department store offers a frequent-buyers card to earn rewards for purchases customers make at the store. Each transaction is worth 12 points, and customers automatically earn 25 points when they sign up.

Write an equation for the function that gives the card value based on the number of transactions that have occurred.

A. What units would be associated with the variables in this?

B. Complete the verbal model for the frequent-buyers card function. Include units.

Card Value (points) = Initial Value (points) +
_____

C. Write the function rule for the card-value function C.

C(t) = _____ + _____(t), where t is the # of transcations.

D. For each 100 points, the customer receives a gift certificate. How many transactions will take for the customer to earn the first gift certificate?

E. What is the y-intercept for this linear function, and what does it represent?

F. What is the slope for this function, and what does it represent?

Fundraising The Band Booster Club is selling T-shirts and blanket wraps to raise money for a trip. The band director has asked the club to raise at least $1000.

The booster club president wants to know how many T-shirts and how many blanket wraps the club needs to sell to meet their goal of $1000. The T-shirt cost $10 each, and the blanket wraps cost $25 each. Write a linear equation that describes the problems, and then graph the linear equation. How can the booster club president use the sales price for each item to meet the goal?

Identify the important information.

- T-shirts cost $_____ each.
- Blanket wraps cost $ _____ each.
- The booster club needs to raise a total of $_____.

Formulate a Plan

The total amount of revenue earned by selling T-Shirts is $_____t.

The total amount of revenue earned from selling blanket wraps is $_____b. These two results can be added and set equal to the sales goal to find the number of T-shirts and blanket wraps that need to be sold to reach $_____. Graph this function to find all the possible combinations of T-shirts and blanket wraps sold to reach $_____.

Solve

Write a linear equation for the sales goal.

_____b + _____t = _____

Calculate three pairs of values for t and b, and graph a line through those points to find possible solutions. Label the graph.

Justify and Evaluate

The x-intercept represents the number of _____ that need to be sold if no _____ are sold. The y-intercept represents the number of _____ to be sold if no _____ are sold. The booster club president can use the _____ to find the possible combinations of T-shirts and blankets to reach _____.

Reflect

Technically, the graph of possible combinations of T-shirts and blanket wraps that reach the goal of $1000 should be discrete. That is, it should be only points, not a line. But for convenience, the graph is shown as a connected line. Explain why the solutions to this problem would be only the points on the line that have whole-number coordinates.

Try Another

A sandwich shop sells sandwiches for $5 each and bottles of water for $1 each. The owner of this shop needs to earn a total of $100 by the end of the day. Write a linear equation that describes the problem. Make sure to label both axes with appropriate titles. Then use the graph to determine how many sandwiches the shop must sell if no waters are sold.

Elaborate

How can the graph of a linear function be used to find answers to a real-world problem?

What is the first step when modeling linear relationships given limited information?