

Algebra 1

6.4 Transforming Linear Functions

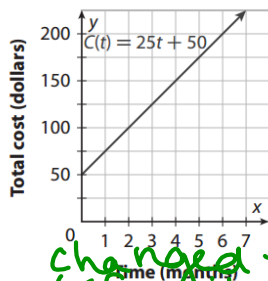
Complete the Graphing Calculator Investigation.

Interpreting Parameter Changes in Linear Models

A gym charges a one-time new member fee of \$50 and then a monthly membership fee of \$25. The total cost C of being a member of the gym is given by the function $C(t) = 25t + 50$, where t is the time (in months) since joining the gym. For each situation described below, sketch a graph using the given graph of $C(t) = 25t + 50$ as a reference.

- (A) The gym decreases its one-time fee for new members.

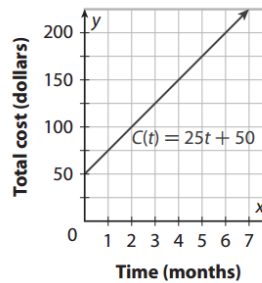
What change did you make to the graph of $C(t) = 25t + 50$ to represent a lower one-time fee?



changed the b shifts it down but keeps same slope

- (B) The gym increases its monthly membership fee.

What change did you make to the graph of $C(t) = 25t + 50$ to represent an increased monthly fee?



steeper slope y-int stayed same

Reflect

5. Suppose the gym increases its one-time new member fee *and* decreases its monthly membership fee. Describe how you would alter the graph of $C(t) = 25t + 50$ to illustrate the new cost function.

the b increases shifting the graph up the m became less steep or vertically shrank

Your Turn

Determine what will happen to the graph of the original function when the described changes occur.

6. Once a year the gym offers a special in which the one-time fee for joining is waived for new members. What impact does this special offer have on the graph of the original function $C(t) = 25t + 50$?

b ↓ so it shifts the graph down but keeps slope the same.

7. Suppose the gym increases its one-time joining fee *and* decreases its monthly membership fee. Does this have any impact on the domain of the function? Does this have any impact on the range of the function? Explain your reasoning.



The domain of the function doesn't change because it's the amount of months that you go to the gym. The range changes though because the value of b is increasing.

Elaborate

8. How do changes to m in the equation $f(x) = mx$ affect the graph of the equation?

it affects the steepness of the line.

9. How do changes to b in the equation $f(x) = x + b$ affect the graph of the equation?

it moves (translates) the graph up or down

10. Which parameter causes the steepness of the graph of the line to change for the family of linear functions of the form $f(x) = mx + b$?

m

11. **Essential Question Check-In** What are the different types of transformations?

reflection, vertical shrink/stretch, translations

Homework

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