

8.F.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of each function from a description of a relationship or from two (x,y) values. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or table.

Jerald created the following chart to track the amount of dog food his dog ate.

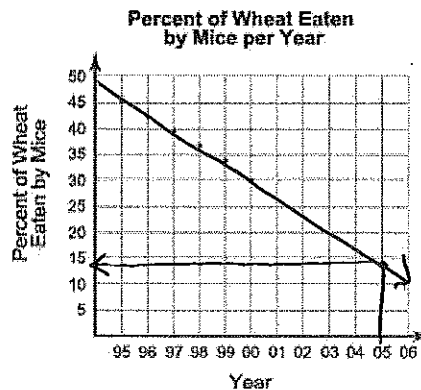
Day (x)	0	3	6
Amount of Dog Food (y)	20	18	16

3
-2

If Jerald starts out with 20 pounds of dog food, which equation represents how much dog food (y) will be left after any day (x)?

- A) $y = -\frac{1}{3}x + 10$ C) $y = -\frac{1}{3}x + 20$
 B) $y = -\frac{2}{3}x + 10$ (D) $y = -\frac{2}{3}x + 20$

The percentage of wheat grain eaten by mice in a farmer's field is shown below.



- Which of the following is the MOST LIKELY percentage in 2005?
 A) 0 (B) 14 C) 25 D) 45

In the table below $f(x)$ is a linear function. When $x=8$, what is the value of $f(x)$?

x	f(x)
1	5
5	17
8	?

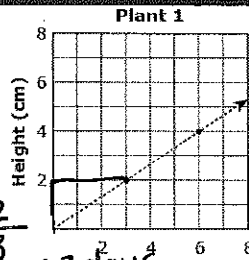
$y = mx + b$
 $5 = 3(1) + b$
 $-3 -3$
 $2 = b$
 $y = 3x + 2$
 $y = 3(8) + 2$
 $y = 26$

- A) 19
 B) 20
 C) 22
 (D) 26

Roberto has a certain number of songs on his iPod. Each week, he plans to add 4 more songs. After 5 weeks, he had 40 songs on his iPod. Which statement is true?

- A) Roberto adds 10 songs on his iPod per week.
 B) Roberto adds 40 songs on his iPod per week.
 C) The initial number of songs on Roberto's iPod is 10.
 (D) The initial number of songs on Roberto's iPod is 20.

A biology teacher gave three students in his class a different plant. He asked the students to record the heights of their plants, in centimeters (cm), everyday for one week. The students reported their results in different displays. Their results are shown in a graph, an equation, and a table.



$m = .6$

Plant 2
 Height = $\frac{3}{5} \times (\text{Day})$

+3cm per 5days

$m = .6$ $m = \frac{12}{3}$
 +2cm per 3 days

Plant 3

Day	1	2	3	4	5	6	7
Height (cm)	0.5	1.0	1.5	2.0	2.5	3.0	3.5

+1.5 +.5cm per day

$m = .5$

Part A: List the plants in order from the slowest rate of growth per day to the greatest rate of growth per day. Explain how you got your answer.

plant 3, plant 2, plant 1
 (.5 per day) (.6 per day) (.6 per day)

I found rate of change & converted to unit rate (divided)

Part B: If the growth rate for Plant 1 remains the same, on what day number will it be 24 cm tall? Explain how you got your answer.

plant 1: No height @ Start $y = .6(x)$
 height day

$24 = .6x$ $x \approx 40$ or $y = \frac{2}{3}x$
 $\frac{24}{.6} = \frac{.6x}{.6}$ $24 = \frac{2}{3}x$
 $\frac{2}{3} \cdot \frac{3}{2} = x$

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During his winter vacation, George rented skis and boots for 5 days from the Slope Slayer Ski Resort. The shop charges the same rate for each day of the rental. Including a \$7.50 application fee, George paid a total of \$177.25 to rent skis and boots. What is the rate of change, in dollars per day, for the function that represents George's rental cost?

- A. \$7.50
- B. \$33.95
- C. \$35.45
- D. \$42.95

$$177.25 = x(5) + 7.50$$

$$\begin{array}{r} -7.50 \\ \hline 169.75 = \frac{x(5)}{5} \end{array}$$

$$\frac{169.75}{5} = x$$

$$33.95 = x$$

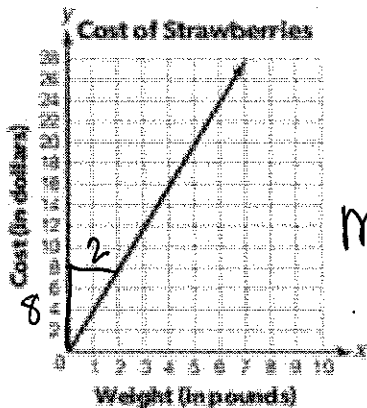
A membership at a classic film center costs \$75 per year. Tickets to films cost members \$5.50. Which of the following statements is true of the annual cost of membership at the film center? Let y =total cost and x =number of films seen.

- A. The annual cost is shown by the linear function $y=x+5.50$. The rate of change is 1, and the initial value is 5.50.
- B. The annual cost is shown by the linear function $y=75x+5.50$. The rate of change is 75, and the initial value is 5.50.
- C. The annual cost is shown by the linear function $y=80.50x$. The rate of change is 80.50, and the initial value is 0.
- D. The annual cost is shown by the linear function $y=5.50x+75$. The rate of change is 5.50, and the initial value is 75.

Andre paid a \$65 annual fee to register with a car rental company. The company charges \$8.50 for each hour a car is rented. What is the rate of change of the function that represents Andre's cost, y , to rent a car for a number of hours, x ?

- A. \$8.50 per hour
- B. \$65 per year
- C. \$73.50 per hour
- D. \$73.50 per year

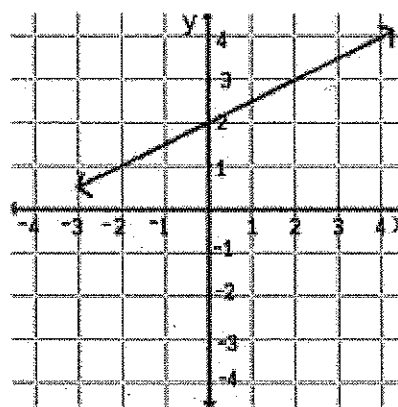
The graph below represents the total cost of strawberries based on the number of pounds purchased. What is the unit cost?



$$m = \frac{8}{2} = \frac{4}{1}$$

- A. \$1 per pound
- B. \$2 per pound
- C. \$4 per pound
- D. \$6 per pound

What function is graphed below?



- a. $y = -\frac{1}{2}x + 2$
- b. $y = x + 2$
- c. $y = 2x + 2$
- d. $y = \frac{1}{2}x + 2$