

Lake Aid is an annual benefit talent show produced by the students of Wilde Lake High School to raise money for the local food bank. Several functions that relate to Lake Aid finances are described in Parts a–c. For each function:

- a. Several of the show organizers researched the possibility of selling DVDs of the show to increase donations to the food bank. They would have to pay for recording of the show and for production of the DVDs. The cost C (in dollars) would depend on the number of DVDs ordered n according to the rule $C = 150 + 2n$.

i. explain what the numbers in the function rule tell about the situation.

For every DVD ordered, it will cost \$2 more
It costs \$150 when you don't order any
DVDs.

ii. explain what the function rule tells you to expect in tables of values for the function.

when $n=0$, $C=150$ and C will go
up by 2 for every 1 n goes up.

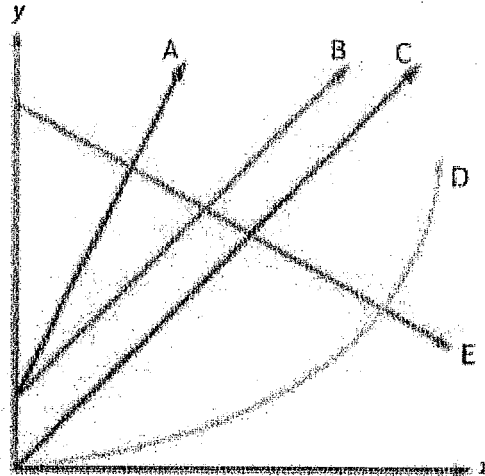
iii. explain what the function rule tells you to expect in a graph of the function.

A y-int at 150
A slope of 2

iv. write a NOW-NEXT rule to describe the pattern of change in the dependent variable.

NEXT = NOW + 2 SA 150

Given below are five functions and at the right five graphs. Without doing any calculating or graphing yourself, match each function with the graph that most likely represents it. In each case, explain the clues that helped you make the match.



- a. $y = x$ C
- b. $y = 2x + 2$ A
- c. $y = 0.1x^2$ D
- d. $y = x + 2$ B
- e. $y = 9 - 0.5x$ E

Explanation: Graph D is not linear and equation c. is not in the form $y = mx + b$.
 Graph C goes through $(0,0)$ and equation a. has $y = x + 0$.
 Graph B has same slope as graph C and d. has same coefficient of x.
 Graph A has same y-int as graph B and they both have constant of 2.
 Graph E is decreasing and the coefficient of x is negative.

Victoria got a job at her school as scorekeeper for a summer basketball league. The job pays \$450 for the summer and the league plays on 25 nights. Some nights Victoria will have to get a substitute for her job and give her pay for that night to the substitute.

a. What should Victoria pay a substitute for one night?

$$450/25 = 18$$

b. Use the letters n for nights a substitute works, S for pay to the substitute, and E for Victoria's total summer earnings.

i. Write a rule for calculating S as a function of n .

$$S = 18n$$

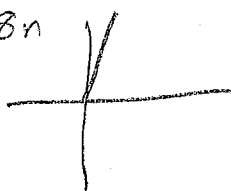
ii. Write a rule for calculating E as a function of n .

$$E = 450 - 18n$$

c. Sketch graphs of the functions that relate total substitute pay and Victoria's total summer earnings to the number of nights a substitute works.

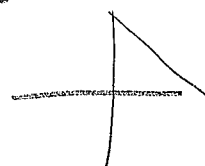
Compare the patterns in the two graphs.

$$S = 18n$$



Each night, substitute pay ↑ at a constant rate
 y-int = 0

$$E = 450 - 18n$$



Each night, earnings ↓ at a constant rate
 y-int = 450

Write rules for linear functions with graphs containing the following pairs of points.

c. (-4, -3) and (2, 3)

Using a table:

x	y
-4	-3
-3	-2
-2	-1
-1	0
0	1
1	2
2	3

using Lin Reg:

L1	L2
-4	-3
2	3

Lin Reg

$y = 1x + 1$ or $y = x + 1$

d. (-6, 4) and (3, -8)

Using a table:

x	y
-6	4
-5	
-4	
-3	0
-2	
-1	
0	-4
1	
2	
3	-8

Using Lin Reg:

L1	L2
-6	4
3	-8

Lin Reg

$y = -1.\bar{3}x - 4$

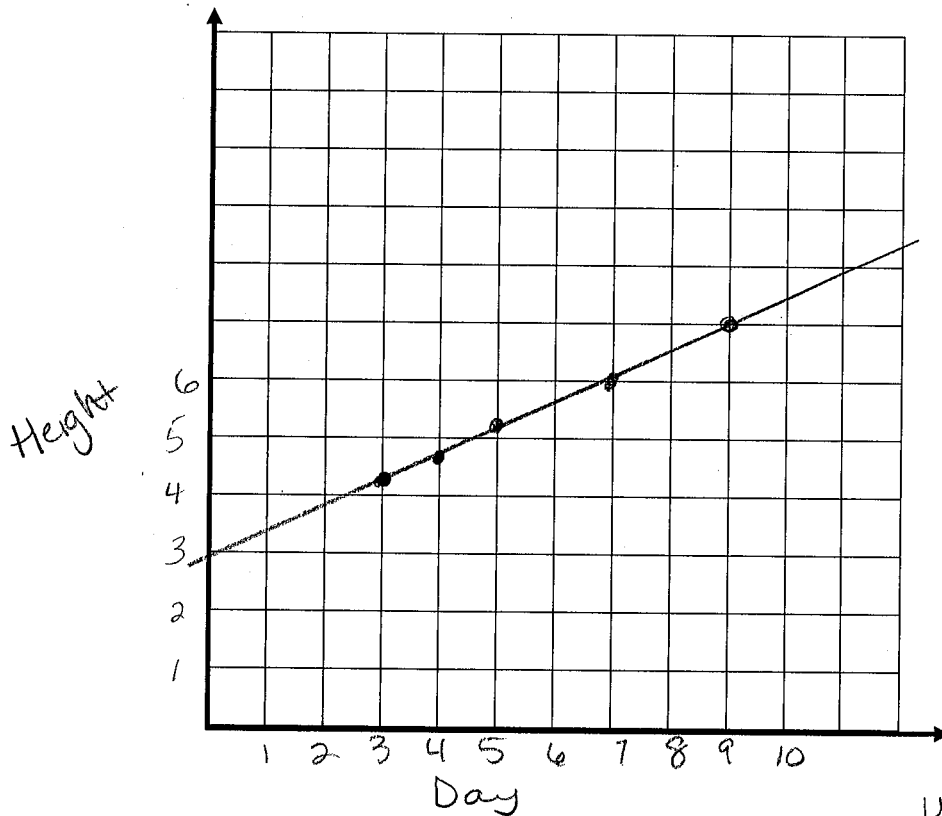
$y = -\frac{4}{3}x - 4$

7 The table below shows the pattern of growth for one bean plant grown under special lighting.



Day	Height (in cm)
3	4.2
4	4.7
5	5.1
7	6.0

a. Plot the (day, height) data and draw a line that is a good fit for the trend in the data.



L1	L2
3	4.2
4	4.7
5	5.1
7	6.0

using LinReg:

$$H = 2.9 + .45D$$

b. Write a function rule for your linear model. What do the numbers in the rule tell about days of growth and height of the bean plant?

From graph: $H = 3 + 0.5D$

At the start, the bean plant was 3 cm tall.
For each day, it grows 0.5 cm

At the start, the bean plant was 2.9 cm tall.
Each day, the plant grows .45 cm.

c. Predict the height of the plant on day 6 and check to see if that prediction seems to fit the pattern in the data table.

$$H = 3 + 0.5(6)$$

$$H = 6 \text{ cm}$$

$$H = 2.9 + .45(6)$$

$$H = 5.6 \text{ cm}$$

Estimated from the graph:
5.6 or 5.7 cm