

1. Lin is tracking the progress of her plant's growth. Today the plant is 5 cm high. The plant grows 1.5 cm per day.

a. Write a linear model that represents the height of the plant after d days.

$$y = 1.5x + 5$$

b. What will the height of the plant be after 20 days?

$$y = 1.5(20) + 5 = 35 \text{ cm}$$

2. Mr. Thompson is on a diet. He currently weighs 260 pounds. He loses 4 pounds per month.

a. Write a linear model that represents Mr. Thompson's weight after m months.

$$w = 260 - 4m$$

b. After how many months will Mr. Thompson reach his goal weight of 220 pounds?

$$220 = 260 - 4m$$
$$-40 = -4m$$

$$\boxed{m = 10} \quad \underline{10 \text{ months}}$$

3. Paul opens a savings account with \$350. He saves \$150 per month. Assume that he does not withdraw money or make any additional deposits.

a. Write a linear model that represents the total amount of money Paul deposits into his account after m months.

$$y = 150m + 350$$

b. After how many months will Paul have more than \$2,000?

$$150m + 350 > 2000$$
$$150m > 1650$$

$$m \geq 11$$

more than 11 months

4. The population of Bay Village is 35,000 today. Every year the population of Bay Village increases by 750 people.

a. Write a linear model that represents the population of Bay Village x years from today.

$$y = 35,000 + 750x$$

b. In approximately many years will the population of Bay Village exceed 50,000 people?

$$35,000 + 750x > 50,000$$

$$x > 20 \text{ yrs}$$

5. Conner has \$25,000 in his bank account. Every month he spends \$1,500. He does not add money to the account.

a. Write a linear model that shows how much money will be in the account after x months.

$$y = 25,000 - 1,500x$$

b. How much money will Conner have in his account after 8 months?

$$y = 25,000 - 1,500(8) = \$13,000$$

6. A cell phone plan costs \$30 per month for unlimited calling plus \$0.15 per text message.

a. Write a linear model that represents the monthly cost of this cell phone plan if the user sends t text messages.

$$y = 30 + 0.15t$$

b. If you send 200 text messages, how much would you pay according to this cell phone plan?

$$y = 30 + 0.15(200) = \$60$$

7. Amery has x books that weigh 2 pounds each and y books that weigh 3 ~~books~~ pounds each. The total weight of his books is 60 pounds.

a. Write a linear model that relates the number of 2 pound books to the number of 3 pound books Amery has.

$$2x + 3y = 60$$

c. If Amery has 10 3-pound books, how many 2-pound books does he have?

$$2x + 3(10) = 60$$

$$2x = 30$$

$x = 15$ 2-pound books

8. Kara used the linear model $y = 20,000 + 0.3x$ to predict her total salary from achieving total sales of x .

a. What is her base salary? \$20,000

b. What percent commission does she earn? 30%

9. The model $2x + 5y = 85$ can be used to model how much money Tim spent on x sodas and y sandwiches. If he bought 15 sodas, how many sandwiches did he purchase?

Solution:

$$2x + 5(15) = 85$$

$$2x + 75 = 85$$

$$2x = 10 \text{ or } x = 5$$

Tim bought 5 sandwiches.

What is the error? Explain how to solve the problem.

He divided 10 by 2 to get 2 but should've gotten 5. He bought 5 sandwiches

10. A bacteria population doubles every minute. Explain why this population growth cannot be modeled using a linear equation.

doubling represents an exponential growth, whereas linear equations represent a constant growth.