

Write a linear equation in **FUNCTION NOTATION** for each scenario. Remember to define your variables.
Remember: Your slope will be changing with your variables and your intercept will only occur once.

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.

$$H(d) = 1.5d + 5$$

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

$$H(20) = 1.5(20) + 5$$

35 cm tall

2. A salesperson receives a base salary of \$35,000 and a commission of \$5 per sale made.

a. Write a linear model that shows the salesperson's total income based on n total sales.

$$I(n) = 5n + 35000$$

b. If the salesperson makes 350 sales, how much will the salesperson make that year?

$$I(350) = 5(350) + 35000$$

\$36,750

c. If the salesperson wants to make \$40,000 in a year, how many sales will she have to make?

$$\begin{array}{r} 40000 = 5n + 35000 \\ -35000 \quad -35000 \\ \hline \end{array}$$

$$\frac{5000}{5} = \frac{5n}{5}$$

n = 1000 sales

3. 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.

$$W(m) = -4m + 260$$

b. How much will Mr. Thompson weigh after 6 months?

$$W(6) = -4(6) + 260$$

236 pounds

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

$$\begin{array}{r} 220 = -4m + 260 \\ -260 \quad -260 \\ \hline \end{array}$$

$$\frac{-40}{-4} = \frac{-4m}{-4}$$

m = 10 months

4. Paul opens a savings account with \$350. He saves \$150 per month. Assume that he does not withdraw (take out) money or deposit (put in) any more money.

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

$$D(m) = 150m + 350$$

b. How much money will Paul save in 10 months?

$$D(10) = 150(10) + 350$$

\$1850

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

$$\begin{array}{r} 2000 < 150m + 350 \\ -350 \quad -350 \\ \hline 1650 < 150m \\ 150 \quad 150 \\ \hline \end{array}$$

12 < m
m is more than 12 months

5. 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.

$$P(x) = 750x + 35000$$

b. How many people will live in Bay Village in 8 years?

$$P(8) = 750(8) + 35000$$

41,000 people

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

$$\begin{array}{r} 50000 \leq 750x + 35000 \\ -35000 \\ \hline 15000 \leq 750x \end{array}$$

$$\begin{array}{r} 15000 \leq 750x \\ \leq 750x \\ \hline 750 \\ \leq 750x \end{array}$$

$x \geq 20$ years

6. 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.

$$M(x) = -1500x + 25000$$

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

$$M(8) = -1500(8) + 25000$$

\$13,000

c. After how many months will Conner have \$7000 in his account?

$$\begin{array}{r} 7000 = -1500x + 25000 \\ -25000 \\ \hline -18000 = -1500x \end{array}$$

$$\begin{array}{r} -18000 = -1500x \\ = -1500x \\ \hline -1500 \\ = -1500x \end{array}$$

$x = 12$ months

7. 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 texts.

$$C(t) = .15t + 30$$

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

$$C(200) = .15(200) + 30$$

\$60.00

c. If you spent \$48.75, how many text messages did you send?

$$\begin{array}{r} 48.75 = .15t + 30 \\ -30 \\ \hline 18.75 = .15t \end{array}$$

$$\begin{array}{r} 18.75 = .15t \\ = .15t \\ \hline .15 \\ = .15t \end{array}$$

$t = 125$ texts

8. An empty truck weighs 40,000 pounds. The fuel that it transports weighs 12 pounds per gallon.

a. Write a linear model that represents the weight of a truck carry g gallons of fuel.

$$W(g) = 12g + 40000$$

b. If the truck is carrying 152 gallons of fuel, how much does it weigh?

$$W(152) = 12(152) + 40000$$

41,824 lbs

c. How many gallons of gas can the truck carry and still be under the legal limit of 80,000 pounds?

$$\begin{array}{r} 80000 \geq 12g + 40000 \\ -40000 \\ \hline 40000 \geq 12g \end{array}$$

$$\begin{array}{r} 40000 \geq 12g \\ \geq 12g \\ \hline 12 \\ \geq 12g \end{array}$$

$g \leq 3333.\bar{3}$ gallons

d. At \$3.40 per gallon, how much would that fuel sell for at the QuikTrip on Lower Roswell?

$$\begin{array}{r} 3333.\bar{3} \text{ gal} \times \$3.40 \\ \hline 116 \end{array}$$

= \$11,333.33