Instruction

Guided Practice 3.9.1

Example 1

You visit a pick-your-own apple orchard. There is an entrance fee of $5.00, plus you pay $0.50 for each apple you pick. Write a function to represent this scenario. Complete a table of values to show your total cost if you pick 10, 20, 30, 40, and 50 apples. Graph the line and identify the parameters in this problem. What do the parameters represent in the context of the problem?

1. Write a function.

   This scenario is represented by a linear function.

   Identify the slope and the y-intercept.

   - The slope is the $0.50 charged for each apple picked.
   - The y-intercept is the entrance fee of $5.00.

   Substitute the slope and the y-intercept into the linear function $f(x) = mx + b$, where m is the slope and b is the y-intercept.

   The function for this scenario is $f(x) = 0.5x + 5$.

2. Create a table.

   Let x = the number of apples picked and $f(x)$ = the total cost.

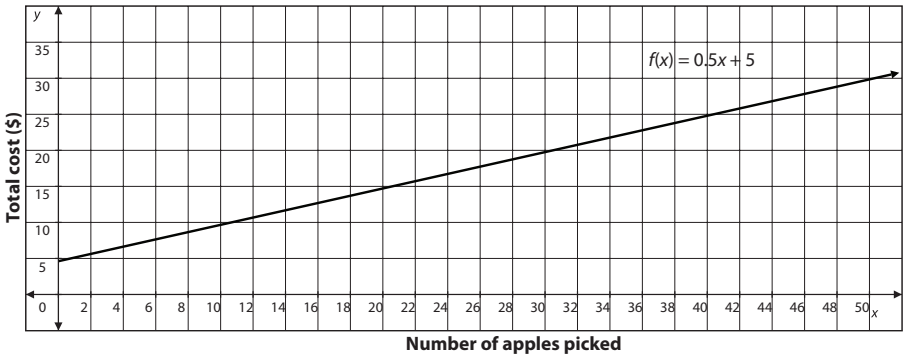
   Use the values 0, 10, 20, 30, 40, and 50 for x.

x	$0.5x + 5$	$f(x)$
0	0.5(0) + 5	0
10	0.5(10) + 5	10
20	0.5(20) + 5	15
30	0.5(30) + 5	20
40	0.5(40) + 5	25
50	0.5(50) + 5	30

Instruction

3. Graph the function.

   Use the table of values to plot the equation of the line.



4. Identify the parameters.

   The parameters in this problem are the slope and the *y*-intercept. In this problem, the *y*-intercept is the entrance fee, \$5.00, and the slope is the cost per apple, \$0.50.

Example 2

You deposit \$100 into a long-term certificate of deposit (CD) in which your money will double every 7 years. Write a function to show how much money you will have in total in 7, 14, 21, 28, and 35 years. Use the function to create a table, and then graph the function. What do the parameters represent in the context of this problem?

1. Write a function.

   This scenario is represented by an exponential function.

   - The initial deposit is \$100.
   - Your money doubles every 7 years, so the growth factor is 2.
   - The time period is 7 years.

   Substitute these values into the exponential function.

   The function for this scenario is $f(x)=100(2)^{\frac{x}{7}}$.

Instruction

2. Create a table.

   Let x = the number of years and $f(x)$ = the amount of money in dollars.

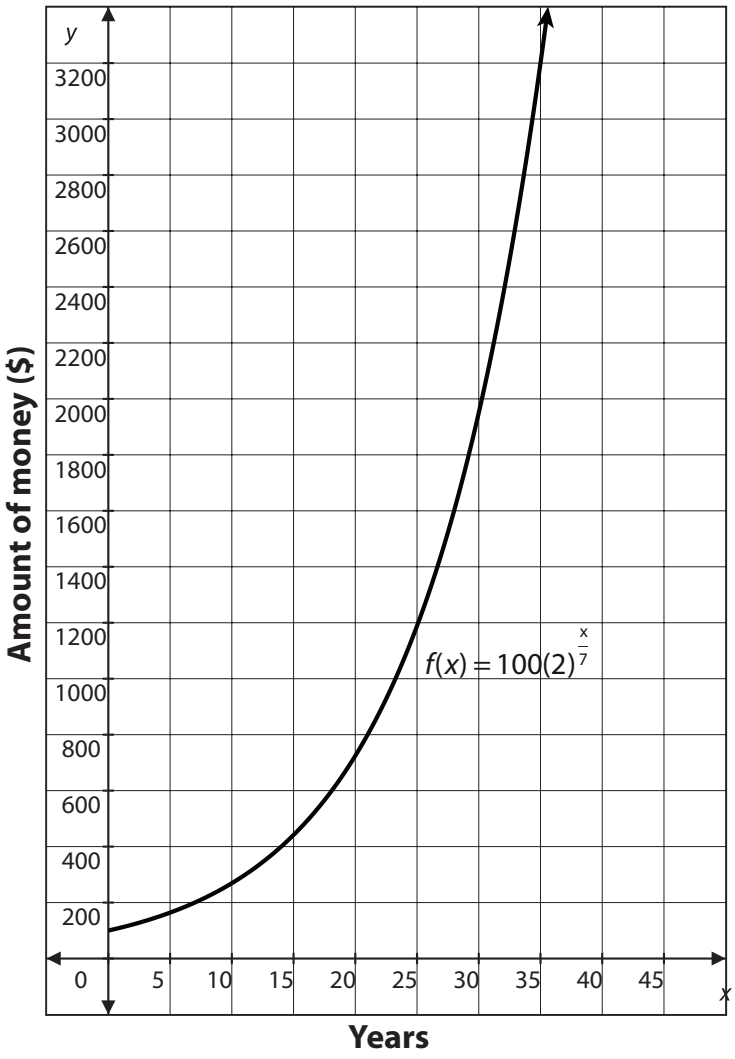
   Use the values 7, 14, 21, 28, and 35 for x.

x	$100(2)^{\frac{x}{7}}$	$f(x)$
7	$100(2)^{\frac{7}{7}}$	200
14	$100(2)^{\frac{14}{7}}$	400
21	$100(2)^{\frac{21}{7}}$	800
28	$100(2)^{\frac{28}{7}}$	1600
35	$100(2)^{\frac{35}{7}}$	3200

Instruction

3. Graph the function.

   Use the table of values to plot the function.



4. Identify the parameters.

   The parameters in this problem are the starting amount of $100 and the base of 2.

Instruction

Example 3

You are growing bacteria in science class. You start with 1 bacterium, which doubles every 12 hours. Write a function to show how many bacteria you have after 12 hours, 24 hours, 36 hours, 48 hours, and 60 hours. Use the function to create a table, then graph the function. What are the parameters in this problem?

1. Write a function.

   This scenario is represented by an exponential function.

   - The initial number of bacteria is 1.
   - The bacteria double every 12 hours, so the growth factor is 2.
   - The time period is 12 hours.

   Substitute these values into the exponential function.

   The function for this scenario is $f(x)=2^{\frac{x}{12}}$.

2. Create a table.

   Let x = the number of hours and $f(x)$ = the number of bacteria.

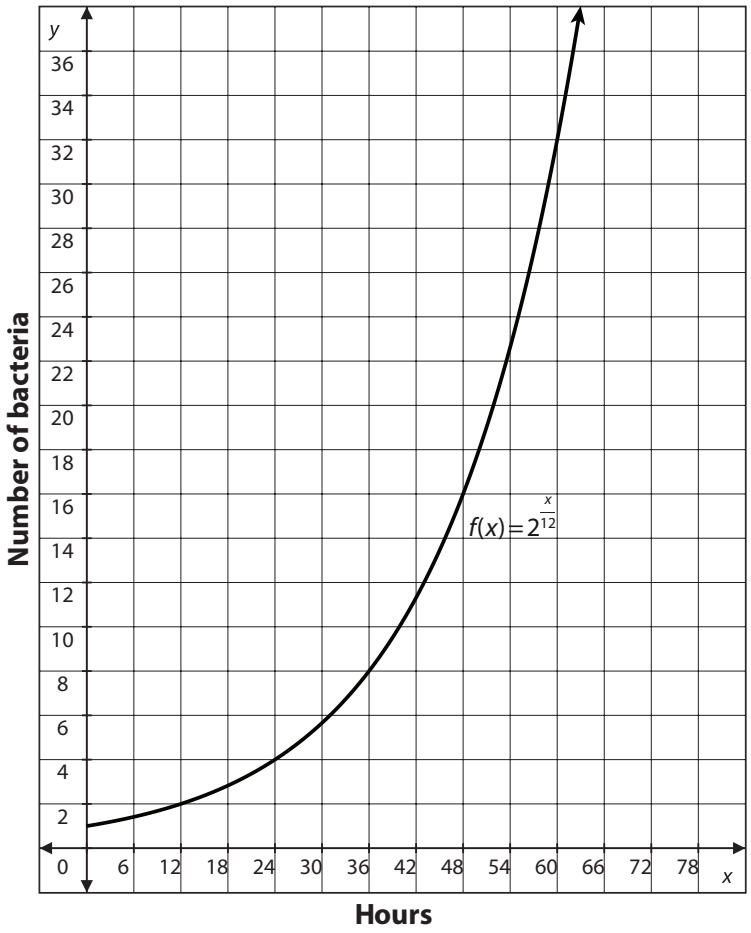
   Use the values 0, 12, 24, 36, 48, and 60 for x.

x	$1(2)^{\frac{x}{12}}$	$f(x)$
0	$1(2)^{\frac{0}{12}}$	1
12	$1(2)^{\frac{12}{12}}$	2
24	$1(2)^{\frac{24}{12}}$	4
36	$1(2)^{\frac{36}{12}}$	8
48	$1(2)^{\frac{48}{12}}$	16
60	$1(2)^{\frac{60}{12}}$	32

Instruction

3. Graph the function.

   Use the table of values to plot the function.



4. Identify the parameters.

   The parameters in this problem are the starting amount of 1 bacterium and the base of 2.