LESSON MAKER PRO

Find the Function

Build linear and exponential rules from graphs, tables, and situations.

HIGH SCHOOL · F.LE.2

F.LE.2 "Construct linear and exponential functions using a graph, a description of a relationship, or two input-output pairs (include reading these from a table)."

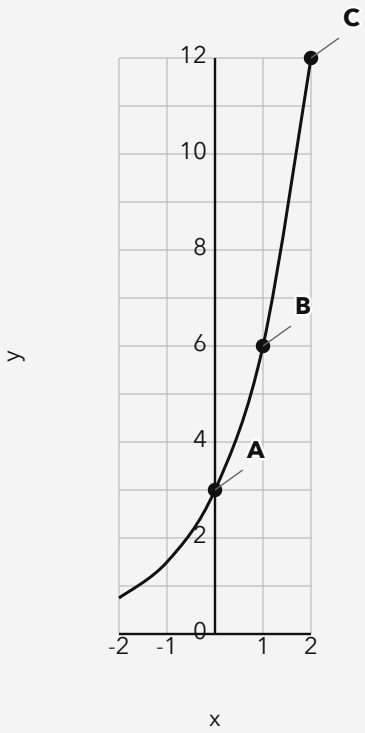
NAME _____ DATE _____

LOOK FOR THE CHANGE

For equal steps in x, a linear function adds the same amount to y, while an exponential function multiplies y by the same factor. Find that change from two points, then use a point to write the function.

WORKED EXAMPLE

The graph shows an exponential function. Write its equation.

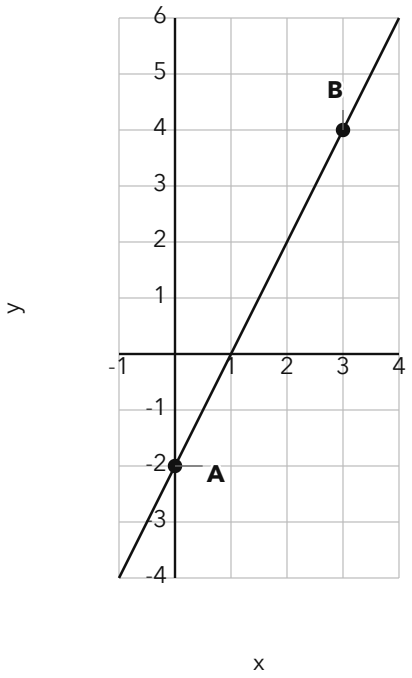


1. At x = 0, y = 3, so the starting value is 3.
2. From x = 0 to x = 1, y changes from 3 to 6. The factor is 6/3 = 2.
3. Use starting value times factor^{x}: y = 3(2^{x}).

Answer: y = 3(2^{x})

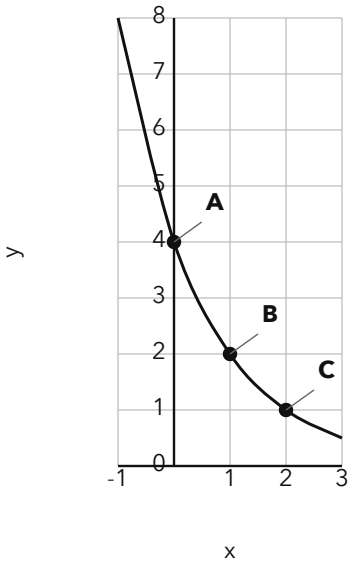
PRACTICE 6 problems

1 The graph shows a linear function. Write its equation.



ANSWER _____

2 The graph shows an exponential function. Write its equation.



ANSWER _____

3 The table shows a linear function. Write its equation.

x	y
-1	8
0	5
1	2
2	-1

ANSWER _____

4 The table shows an exponential function. Write its equation.

x	y
0	2
1	8
2	32

ANSWER _____

5 A linear function passes through (2, 11) and (5, 20). Write its equation.

ANSWER _____

6 An exponential function passes through (1, 12) and (3, 108). Write its equation.

ANSWER _____

APPLY IT Show your work

1 A student starts a music channel. The channel has 120 followers on day 2 and 210 followers on day 5. If it gains followers at a constant rate, write a function f(x) for its followers on day x. How many followers will it have on day 7?

WORK SPACE

ANSWER _____

2 A student posts a short video. It has 15 views at hour 0, and its view count triples each hour. Write a function v(x) for its views after x hours. How many views will it have after 4 hours?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The table shows an exponential function. Write its equation and find y when x = 5. Explain why the factor for each 1-unit increase in x is not 9.

x	y
0	7
2	63
4	567

WORK SPACE AND ANSWER

ANSWER KEY

Find the Function

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The graph shows a linear function. Write its equation.	**$y = 2x - 2$**
2	The graph shows an exponential function. Write its equation.	**$y = 4(1/2)^x$**
3	The table shows a linear function. Write its equation.	**$y = -3x + 5$**
4	The table shows an exponential function. Write its equation.	**$y = 2(4)^x$**
5	A linear function passes through (2, 11) and (5, 20). Write its equation.	**$y = 3x + 5$**
6	An exponential function passes through (1, 12) and (3, 108). Write its equation.	**$y = 4(3)^x$**

PART 2 · APPLY IT

1. **$f(x) = 30x + 60$; 270 followers on day 7** The rate is (210 - 120)/(5 - 2) = 30 followers per day. Day 0 has 120 - 2(30) = 60 followers, and f(7) = 270.
2. **$v(x) = 15(3)^x$; 1,215 views after 4 hours** Use 15 as the starting value and 3 as the hourly factor. Then $v(4) = 15(3^4) = 1{,}215$.

CHALLENGE

$y = 7(3)^x$; $y = 1{,}701$ when $x = 5$. Each 2-unit increase multiplies y by 9, so each 1-unit increase multiplies it by 3.

Accept equivalent forms of each function. In the challenge, accept any explanation that identifies 3 as the positive 1-unit factor because 3 × 3 = 9.