ALBERT

Name _____ Date _____

Writing Linear and Exponential Functions Worksheet

Algebra 1 · Common Core HSF-LE.A.2

> Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

Practice

Builds the skill step by step.

1. A line passes through (0, 3) and (2, 7). What is its slope?

2. Which linear function passes through (0, 3) and (2, 7)?

   A. $f(x) = 2x + 7$

   B. $f(x) = 3x + 2$

   C. $f(x) = 4x + 3$

   D. $f(x) = 2x + 3$

3. An exponential function $f(x) = a \cdot b^x$ passes through (0, 4) and (1, 12). What is b?

4. Which exponential function passes through (0, 4) and (1, 12)?

   A. $f(x) = 4x + 8$

   B. $f(x) = 4 \cdot 3^x$

   C. $f(x) = 3 \cdot 4^x$

   D. $f(x) = 12 \cdot 4^x$

5. Which rule gives the arithmetic sequence 6, 11, 16, … (n = 1, 2, 3, …)?

   A. $f(n) = 5n + 1$

   B. $f(n) = 6n$

   C. $f(n) = 5n + 6$

   D. $f(n) = n + 5$

6. Which rule gives the geometric sequence 5, 10, 20, … (n = 1, 2, 3, …)?

   A. $f(n) = 5 \cdot 2^{n}$

   B. $f(n) = 5n$

   C. $f(n) = 5 \cdot 2^{n-1}$

   D. $f(n) = 2 \cdot 5^{n-1}$

7. A line passes through (1, 5) and (3, 11). What is its slope?

8. For that line (through (1, 5) and (3, 11)), what is the y-intercept?

9. A population starts at 200 and grows 10% each year. Which function models it after t years?

   A. $P(t) = 200(1.1)^{t}$

   B. $P(t) = 200 + 10t$

   C. $P(t) = 200(0.1)^{t}$

   D. $P(t) = 200 + 1.1t$

10. A supply of 50 cans decreases by 4 cans each day. Which function models it after t days?

    A. $S(t) = 4 - 50t$

    B. $S(t) = 50 - 4t$

    C. $S(t) = 50(4)^{t}$

    D. $S(t) = 50(0.96)^{t}$

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On Level

Grade-level practice.

1. An exponential function $f(x) = a \cdot b^x$ passes through (0, 2) and (3, 54). What is b?

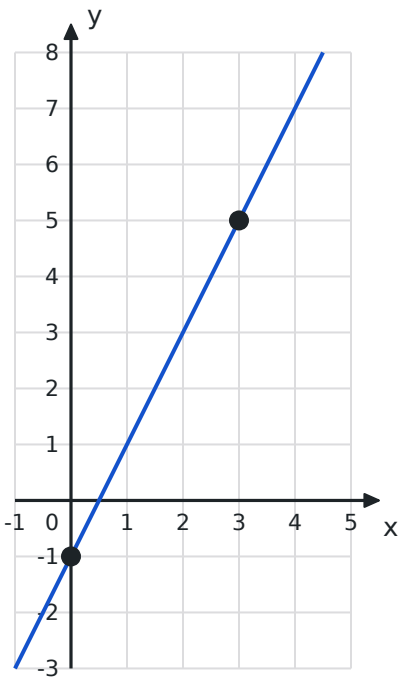
2. An exponential function $f(x) = a \cdot b^x$ passes through (1, 6) and (3, 54). What is a?

3. A line passes through (2, 9) and (6, 1). What is its y-intercept?

4. The table shows an exponential function $f(x) = a \cdot b^x$. What is b?

x	0	1	2	3
f(x)	1000	900	810	729

5. What is the slope of the line in the graph?



6. An exponential function passes through (0, 500) and (1, 400). Write the function and explain how you found it.

7. A bacteria count is 300 at t = 0 and 1,200 at t = 2, growing exponentially. What is the growth factor b per unit of t?

8. A line passes through (−2, 1) and (4, 4). What is its slope?

9. Which rule gives 3, 12, 48, … (n = 1, 2, 3, …)?

   A. $f(n) = 3 \cdot 4^{n-1}$

   B. $f(n) = 4 \cdot 3^{n-1}$

   C. $f(n) = 9n - 6$

   D. $f(n) = 3 \cdot 4^{n}$

10. The table shows a linear function. What is f(10)?

x	1	2	3
f(x)	7	11	15

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Challenge

Multi-step and word problems that stretch it.

1. An exponential function $f(x) = a \cdot b^x$ passes through (2, 12) and (4, 48). What is a?

2. An exponential function $f(x) = a \cdot b^x$ passes through (1, 10) and (3, 2.5). What is a?

3. A line passes through (−3, 10) and (5, −6). What is its y-intercept?

4. A town had 2,000 people in 2010 and 2,420 in 2012, growing by a constant percent each year. What is the yearly growth rate?

5. A car is worth 24,000 dollars new and 19,440 dollars after 2 years, losing a constant percent each year. What percent does it lose each year?

6. A culture starts with 100 bacteria and doubles every 3 hours. Write the model and find the count after 9 hours.

7. Which function fits the points (0, 5), (1, 15) and (2, 45)?

   A. $f(x) = 3 \cdot 5^x$

   B. $f(x) = 5x^2 + 5$

   C. $f(x) = 5 \cdot 3^x$

   D. $f(x) = 10x + 5$

8. Write a linear function and an exponential function that both pass through (1, 4) and (2, 8).

9. An arithmetic sequence has $a_4 = 19$ and $a_9 = 44$. What is a_1?

10. An exponential function $f(x) = a \cdot b^x$ passes through (0, 2) and (3, 16). What is f(5)?