

Identify the initial amount a and the rate of growth r (as a percent) for each exponential function. Evaluate the function when $t = 5$. Round your answer to the nearest tenth.

1. $y = 50(1 + 0.25)^t$

$y = 50(1.25)^5$

$a = \underline{50}$

$r = \underline{25\%}$

$t = 5: \underline{152.6}$

2. $y = 172(1 + 0.3)^t$

$y = 172(1.3)^5$

$a = \underline{172}$

$r = \underline{30\%}$

$t = 5: \underline{638.6}$

3. $y = 1000(1.75)^t$

$y = 1000(1.75)^5$

$a = \underline{1000}$

$r = \underline{75\%}$

$t = 5: \underline{16,413.1}$

$1+r = 1.75$
 $r = 0.75$

Write a function that represents the situation.

4. Profits of \$100,000 ^{$a$} increase by 15% ^{$r = 0.15$} each year.

$y = 100000(1.15)^t$

5. College enrollment of 41,000 ^{a} increases by 7% ^{$r = 0.07$} every year.

$y = 41000(1.07)^t$

6. The number of food trucks in a city has been increasing by 50% ^{$r = 0.5$} annually. There were two food trucks ^{a} in the year 2010.

a. Write an exponential growth function that represents the number of food trucks t years after 2010.

$y = 2(1.5)^t$

b. How many food trucks will there be in the year 2030? ^{$t = 20$} Does this sound reasonable? Explain.

$y = 2(1.5)^{20}$

$y = 6650.5 \approx 6,651 \text{ trucks}$

It is not reasonable to have 6,651 food trucks in one city.

Identify the initial amount a and the rate of decay r (as a percent) of the exponential function. Evaluate the function when $t = 3$. Round your answer to the nearest tenth.

7. $y = 12(1 - 0.35)^t$

$y = 12(0.65)^3$
 $y = 3.3$

$a = 12$

$r = 35\%$

$t = 3: 3.3$

8. $y = 360(1 - 0.9)^t$

$y = 360(0.1)^3$
 $y = 0.4$

$a = 360$

$r = 90\%$

$t = 3: 0.4$

9. $h(t) = 550(0.4)^t$

$h(3) = 550(0.4)^3$
 $h(3) = 35.2$

$\rightarrow 1 - r = 0.4$
 $-r = -0.6$
 $r = 0.6$

$a = 550$

$r = 60\%$

$t = 3: 35.2$

Write a function that represents the situation.

10. A school population of 1200 decreases by 6% each year.

$y = 1200(1 - 0.06)^t \rightarrow y = 1200(0.94)^t$

11. A stock values at \$49.50 decreases in value by 7% each year.

$y = 49.50(1 - 0.07)^t \rightarrow y = 49.50(0.93)^t$

Determine whether the table represents an exponential growth function, an exponential decay function, or neither. Explain.

12.

x	0	1	2	3
y	4	12	36	108

$\times 3$ $\times 3$ $\times 3$

13.

x	0	1	2	3
y	200	100	50	25

$\times \frac{1}{2}$ $\times \frac{1}{2}$ $\times \frac{1}{2}$

Exponential growth; ratio > 1

Exponential decay; $0 < \text{ratio} < 1$

Determine whether the function represents exponential growth or exponential decay. Identify the percent rate of change.

14. $y = 3(0.4)^t$
 $\uparrow < 1$ $1 - r = 0.4$
 $r = 0.6$

15. $y = 18(1.3)^t$
 $\uparrow > 1$ $1 + r = 1.3$
 $r = 0.3$

16. $y = 41(1.07)^t$
 $\uparrow > 1$ $1 + r = 1.07$
 $r = 0.07$

Exponential decay; rate = 60%

Exponential; rate = growth 30%

Exponential; rate = growth 7%

Rewrite the function to determine whether it represents exponential growth or exponential decay.

17. $y = (0.3)^{t-2}$
 $y = \frac{0.3^t}{0.3^2} \approx 11.11(0.3)^t$
 $\leftarrow < 1$
Exponential decay

18. $y = 3(1.6)^{4t}$
 $y = 3(1.6^4)^t$
 $y = 3(6.55)^t$
 $\uparrow > 1$
Exponential growth