7.3 Linear vs. Exponential

Algebra 1 Name: _____ **CA #1**

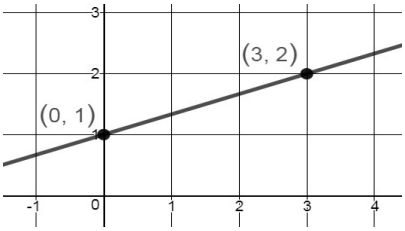
Identify the type of relationship and create a function from the given information.

1. A population p of 100,000 decreases by 2% each year t.

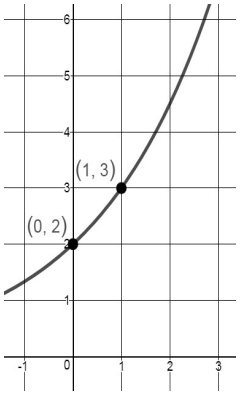
2. A \$900 sound system decreases in value v by \$70 each year t.

3. A bacterial culture has 10 bacteria b that are increasing by 150% each hour h.

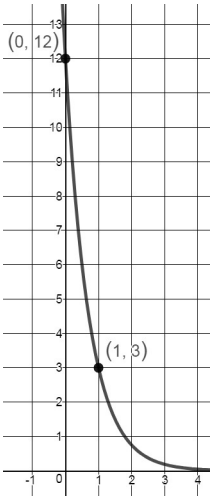
4. Use x and $f(x)$ for your variables.



5. Use x and $f(x)$ for your variables.



6. Use x and $f(x)$ for your variables.



7.

t	0	1	2	3
$v(t)$	9	8.1	7.29	6.561

8.

t	0	1	2	3
$h(t)$	12	30	75	187.5

9.

x	0	1	2	3
$w(x)$	12	10.2	8.4	6.6

Create a model (equation) for each scenario. Use function notation to answer the question.

10. A population p of 10,000 people doubles every 21 years t. How many people will there be in 60 years?	11. After a morning coffee, Mr. Sullivan has 130 mg of caffeine c in his blood. The half-life is 2 hours h. How much caffeine is in his system after 7 hours?
12. A culture of bacteria has 700 cells c that doubles every 8 hours h. How many cells of bacteria will there be in 24 hours?	13. There are 100 grams of radioactive material m. The half-life of the material is 2,000 years t. How much radioactive material will there be in 15,000 years?

Answers to 7.3 CA #1

1. Exponential Decay $p(t) = 100{,}000(0.98)^t$	2. Linear Decay $v(t) = 900 - 70t$	3. Exponential Growth $b(h) = 10(2.5)^h$	4. Linear Growth $f(x) = 1 + \frac{1}{3}x$
5. Exponential Growth $f(x) = 2(1.5)^x$	6. Exponential Decay $f(x) = 12\left(\frac{1}{4}\right)^x$	7. Exponential Decay $v(t) = 9(0.9)^t$	8. Exponential Growth $h(t) = 12(2.5)^t$

9. Linear Decay $w(x) = 12 - 1.8x$	10. $p(t) = 10{,}000(2)^{\frac{t}{21}}$ $p(60) = 72458$ people	11. $c(h) = 130\left(\frac{1}{2}\right)^{\frac{h}{2}}$ $c(7) = 11.49$ mg	12. $c(h) = 700(2)^{\frac{h}{8}}$ $p(24) = 5600$ cells	13. $m(t) = 100\left(\frac{1}{2}\right)^{\frac{t}{2{,}000}}$ $m(15{,}000) = 0.55$ grams