5/20 Algebra I - Downing

Ex)

x	y
0	100
1	20
2	4
3	$\frac{4}{5}$

$\div 5$ or $\times \frac{1}{5}$ ← Dividing by 5 is the same as multiplying by $\frac{1}{5}$

$f(x) = ab^x$

$f(x) = 100\left(\frac{1}{5}\right)^x$

x	g(x)
0	4
1	8
2	16
3	32

$\times 2$, $\times 2$, $\times 2$

$g(x) = 4(2)^x$

Exponential Growth: $y = a(1+r)^t$ → $b > 1$

Exponential Decay: $y = a(1-r)^t$ → $0 < b < 1$

a = starting value

r = rate (as a decimal)

Ex: 25% = .25

17% = .17

5% = .05

4.3% = .043

change % to decimal

t = time

Ex) $y = 2(0.92)^t$

- Exponential Decay
- Starting Value = 2
- rate of Decay = 8% ($100\% - 92\% = 8\%$)

Ex) $f(t) = 1.2^t \longrightarrow 1(1.2)^t$

- Exponential Growth
- Starting Value = 1
- rate of Growth = 20%

$y = ab^x$

a = starting value

b = what you are multiplying by (doubling, tripling, etc)

x = time

★ Worksheet

The inaugural attendance of an annual music festival is 150,000. The attendance y increases by 8% each year.

a. Write an exponential growth function that represents the attendance after t years.

$y = 150000(1+.08)^t$

$y = 150000(1.08)^t$

b. How many people will attend the festival in the fifth year? Round your answer to the nearest thousand.

$y = 150000(1.08)^5 =$

$y = 220,000$ people

1. A website has 500,000 members in 2010. The number y of members increases by 15% each year. (a) Write an exponential growth function that represents the website membership t years after 2010. (b) How many members will there be in 2016? Round your answer to the nearest ~~ten thousand~~ whole

6 years

a) $y = 500,000(1+.15)^t$

$y = 500,000(1.15)^t$

b) $y = 500,000(1.15)^6$

$y = 1,156,530$ members

You buy a car for $48,000 in 2018. If the value of the car depreciates at a rate of 8.25% each year, how much is your car worth in 2032?

2032
-2018

14 years

a) $y = 48000(1-.0825)^t$

$y = 48000(.9175)^t$

b) $y = 48000(.9175)^{14}$

$y = \$14,378.92$

A bacteria culture starts with 350 cells. If it triples every hour, how many cells are there after 4 hours?

a) $y = 350(3)^t$

b) $y = 350(3)^4$

$y = 28,350$ cells