

Write an exponential function for each.

1) $(0,5)(5,5120)$ $y = a \cdot b^x$
 $a = 5$ $\frac{5120}{5} = \frac{5 \cdot b^5}{5}$
 $1024 = b^5$
 $4 = b$

$$y = 5 \cdot 4^x$$
$$f(x) = 5 \cdot 4^x$$

2) The population of Italy was about 58,000,000 million in 1995 and was growing at a rate of about 0.1% per year.

$$f(x) = 58,000,000(1 + 0.001)^t$$

3) 150 grams of bacteria are tripling each day

$$f(x) = 150 \cdot 3^x$$

C

Scientists Matos and Massarelli were working on an experiment which started with 10 Bacteria. The bacteria doubled every hour for 24 hours.

- (a) Write an exponential model for this situation.
(b) Find the number of bacteria after 480 minutes.
(c) Find the number for half of a day. $\frac{480}{60} = 8 \text{ hrs}$

a) $f(x) = 10 \cdot 2^x$

b) $f(x) = 10 \cdot 2^8 = 2560$ bacteria

c) $f(x) = 10 \cdot 2^{12} = 10 \cdot 4096 = 40,960$ bacteria

D

The foundation of your house has about 1200 termites. The termites grow at a rate of about 2.4% per day. How long until the number of termites triples?

$$y = 1200(1.024)^t$$

$$1200(3) = 3600$$

About 477 days

$$f(x) = -3\left(\frac{2}{3}\right)^{x+2}$$

1) What is the parent function?

$$f(x) = 3\left(\frac{2}{3}\right)^x$$

2) What is the asymptote?

$$y = 0$$

3) Name all the transformations.

- 2 units left
- reflection over x-axis

4) Does it represent Growth or Decay?

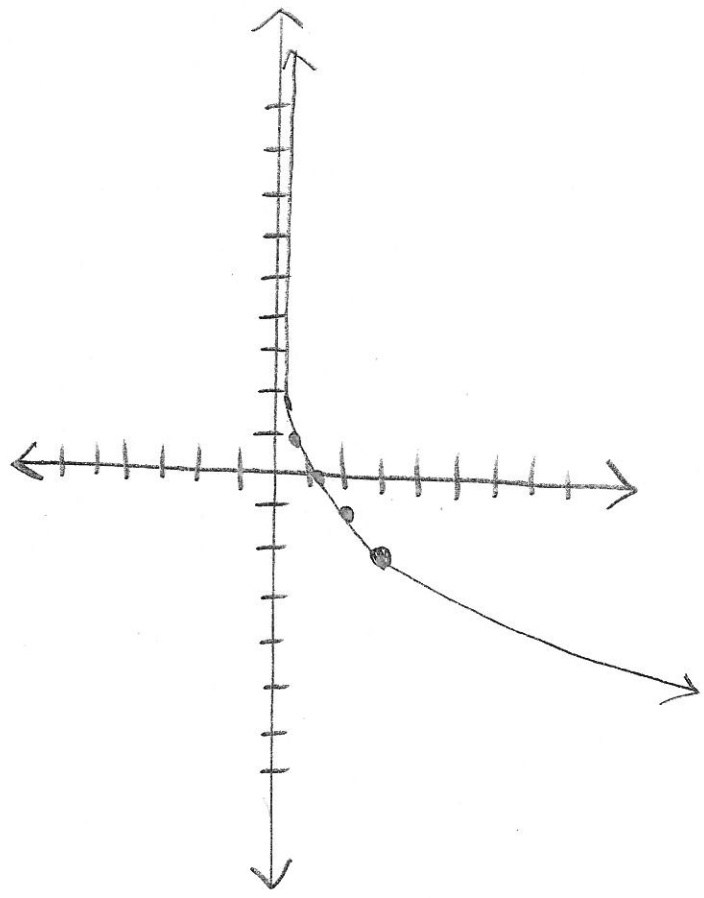
Decay $0 < b < 1$

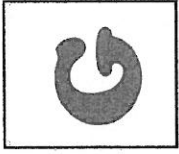
5) Graph using a table of 5 values.

x	y
-2	-3
-1	-2/3
0	-4/9
1	-8/27
2	-16/81

$\frac{1}{3}$
 $\frac{2}{9}$

$$\left(\frac{2}{3}\right)^3 = \frac{8 \cdot 3^1}{27 \cdot 1} = \frac{16 \cdot 3^2}{81 \cdot 27}$$





The population of Winnemucca, Nevada can be modeled by $P = 6191(1.04)^t$ where t is the number of years since 1990.

- (a) What was the population in 1990? *6,191 people*
- (b) By what percent did the population increase by each year? *4 %*
- (c) What will the population be in 2015?

$$P = 6191(1.04)^{25}$$

16,504 people

H

In 1995 there were 285 cell phone subscribers in the small town of Gnat. The number of subscribers increased by 75% per year after 1985.

- (a) How many cell phone subscribers were in Gnat in 1985? $f(x) = 285(1.75)^{-10} = 1$ subscribers
- (b) How many cell phone subscribers were in Gnat in 1994? $f(x) = 285(1.75)^{-1} = 163$ subscribers
- (c) How long until there are 5000 cell phone subscribers? $f(x) = 285(1.75)^x$ In the year 2001

In 6 years

I

You drink a beverage with 120 mg of caffeine. Each hour, the caffeine in your system decreases by about 12%. How long until you have 10 mg of caffeine in your system?

$$f(x) = 120 (1 - 0.12)^t$$

About
20 hours

J

x	y
-2	$\frac{1}{32}$ ($\frac{3}{32}$)
-1	$\frac{1}{16}$ ($\frac{17}{16}$)
0	$\frac{2}{8}$ ($\frac{5}{4}$)
1	$\frac{3}{2}$ ($\frac{17}{6}$)

Make a table of values for the function:

$$f(x) = 2^{x-3} + 1$$

Does the function represent growth or decay?

$$b > 1$$

x	4
-2	2
-1	0
0	-1
1	$-\frac{3}{2}$
2	$-\frac{7}{4}$

K

Make a table of values for the function:

$$f(x) = \left(\frac{1}{2}\right)^x - 2$$

Does the function represent growth or decay?

$$0 < b < 1$$