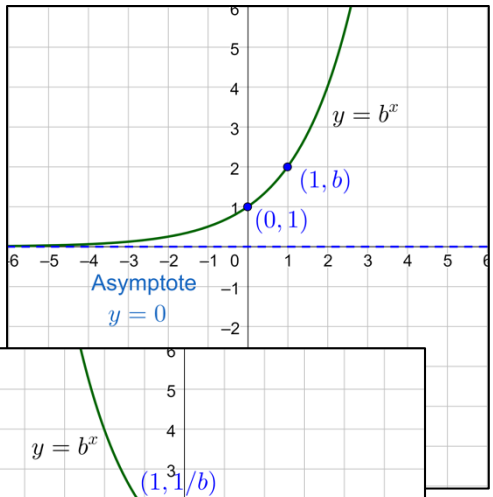
Algebra 2

6-02 Exponential Growth and Decay Functions (6.1)

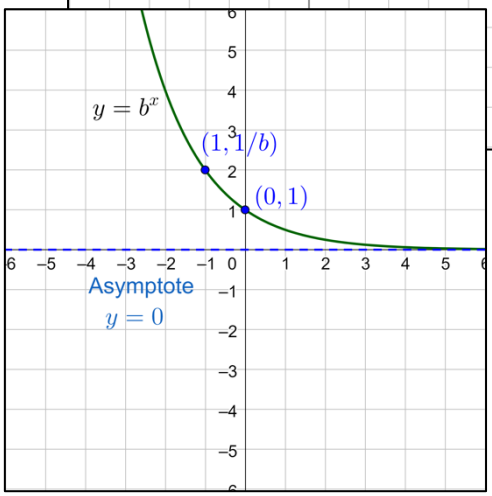
Exponential Function

- $y = b^x$
- _____ (b) is a positive number other than _____



Exponential Growth

- Always _____ and rate of change is _____
- _____
- y-intercept is _____
- Horizontal asymptote _____
- b is the _____ factor

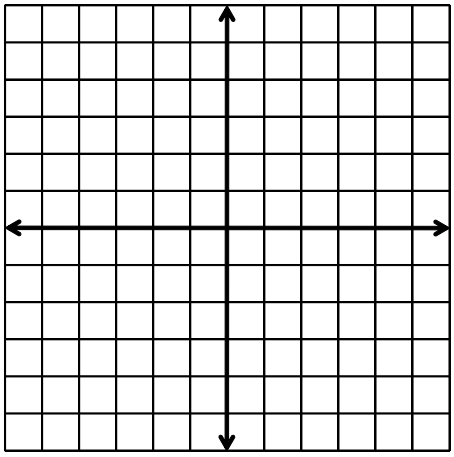


Exponential Decay

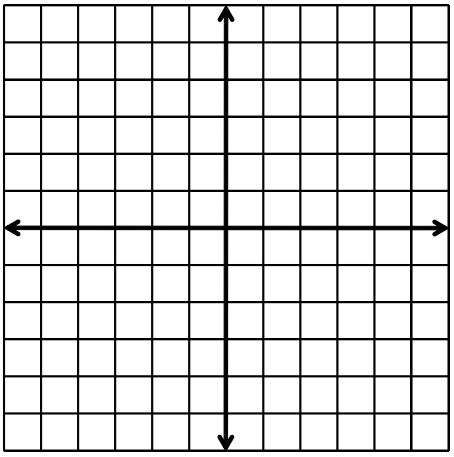
- Always _____ and rate of change is _____
- _____
- y-intercept is _____
- Horizontal asymptote _____
- b is the _____ factor

Determine whether each function represents *exponential growth* or *exponential decay*. Then graph the function.

$f(x) = \left(\frac{1}{6}\right)^x$



$y = \left(\frac{4}{3}\right)^x$



Exponential Growth Model (word problems)

$$y = a(1 + r)^t$$

y = current amount; a = initial amount; r = growth percent; $1 + r$ = growth factor; t = time

Exponential Decay Model (word problems)

$$y = a(1 - r)^t$$

y = current amount; a = initial amount; r = decay percent; $1 - r$ = decay factor; t = time

The population P (in millions) of Peru during a recent decade can be approximated by $P = 28.22(1.01)^t$, where t is the number of years since the beginning of the decade.

(a) Determine whether the model represents exponential growth or decay

(b) Identify the annual percent increase or decrease in population

(c) Estimate when the population was about 30 million

The value of a mountain bike y (in dollars) can be approximated by the model $y = 200(0.65)^t$, where t is the number of years since the bike was purchased.

(a) Determine whether the model represents exponential growth or decay

(b) Identify the annual percent increase or decrease

(c) Estimate when the value of the bike will be $50

Compound Interest

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

A = amount at time t; P = principle (initial amount); r = annual rate; n = number of times interest is compounded per year

Find the balance in the account earning compound interest after 6 years when the principle is $3500.

r = 2.16%, compounded quarterly

298#7-15 odd, 19-22, 44, 35, 39, 40, 41, 42, 53, 54, 55, 61, 63 = 20