

Sec. 8.6 Exponential Functions

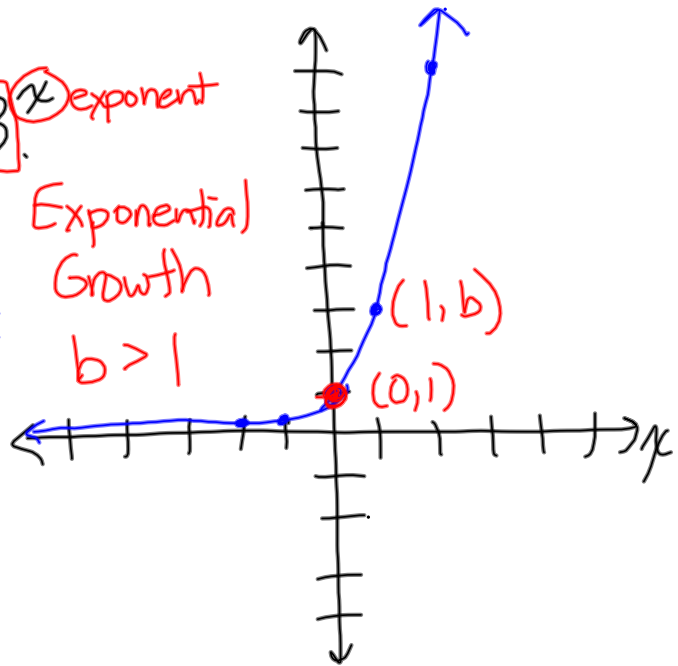
Graph

$$y = \boxed{3}^x$$

base exponent

Exponential Growth

$$b > 1$$



x	y
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9

$\leftarrow 3^{-2} = \frac{1}{3^2}$
 $\leftarrow 3^{-1}$
 $\leftarrow 3^0$
 $\leftarrow 3^1$
 $\leftarrow 3^2$

* (1, b)

Graph $y = \left(\frac{1}{5}\right)^x$

x	y
-2	25
-1	5
0	1
1	$\frac{1}{5}$
2	$\frac{1}{25}$

$$\left(\frac{1}{5}\right)^{-2} \rightarrow \frac{1^{-2}}{5^{-2}} = \frac{5^2}{1^2} = 25$$

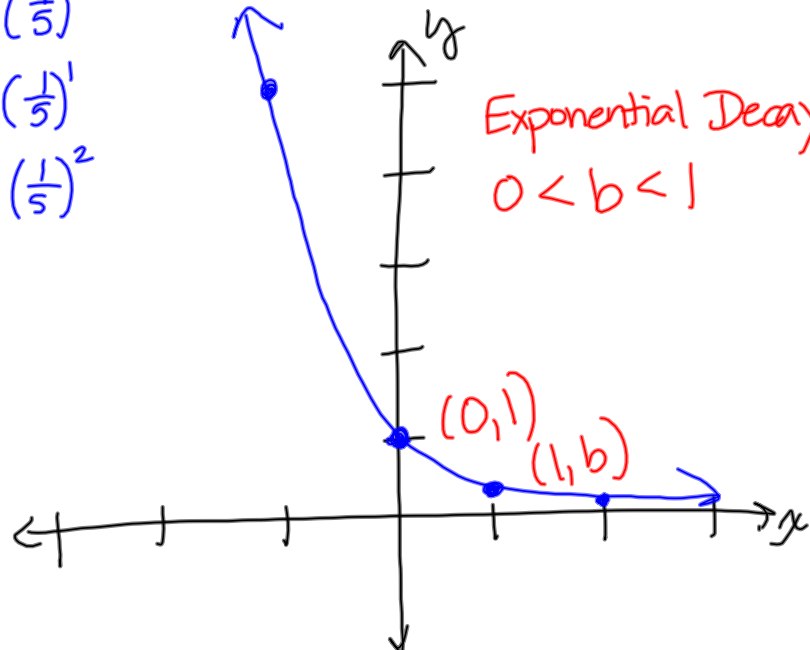
$$\left(\frac{1}{5}\right)^{-1} \rightarrow \frac{1^{-1}}{5^{-1}} = \frac{5}{1}$$

$$\left(\frac{1}{5}\right)^0$$

$$\left(\frac{1}{5}\right)^1$$

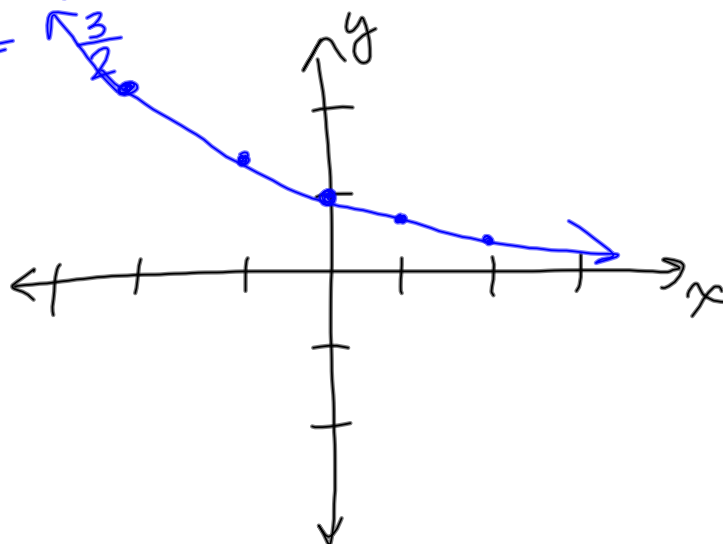
$$\left(\frac{1}{5}\right)^2$$

Exponential Decay
 $0 < b < 1$



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

x	y
-2	$\frac{9}{4} = 2.25$ $\left(\frac{2}{3}\right)^{-2} = \frac{3^2}{2^2} = \frac{9}{4}$
-1	$\frac{3}{2} = 1.5$ $\left(\frac{2}{3}\right)^{-1} = \frac{3}{2}$
0	1 $\left(\frac{2}{3}\right)^0$
1	$\frac{2}{3} \approx .67$ $\left(\frac{2}{3}\right)^1$
2	$\frac{4}{9} \approx 0.44$ $\left(\frac{2}{3}\right)^2$



General Growth Formula

$$A = P(1+r)^t$$

$A \rightarrow$ ending amount

$P \rightarrow$ original amount (principal)

$r \rightarrow$ yearly growth rate \rightarrow decimal

$t \rightarrow$ number of years

Ex: When Chris was born, his parents put \$1,000 into a savings account, guaranteed to increase at a yearly rate of 4.5%. With no additional deposits, by what amount will the account increase in 18 years?

$$A = P(1+r)^t$$

$A \rightarrow A$

$P \rightarrow 1000$

$r \rightarrow 4.5\%$

move dec. 2 places left

0.045

$t \rightarrow 18$

$$A = 1000(1+0.045)^{18}$$

$$A = 1000(\text{multiplier } 1.045)^{18}$$

$$1.045 \boxed{\wedge} 18 \boxed{=} \boxed{\times} 1000$$

or

$$1.045 \boxed{1.045} 18 \boxed{=} \boxed{\times} 1000$$

$$A = \$2208.48$$

P. 407 (7, 17, 29, 31-35)