

Dec. 2, 2013

Sect. 6-1

Exponential Functions

Defn

Graphs

Applications

Defn:

$$f(x) = cb^x$$

Variable is in exponent

b is base of exponent

c is a coeff.

eg.  $f(x) = 2^x$

$$f(x) = 5.91(2.13)^x$$

$$f(x) = 2^x$$

$$\text{Find } f(3) = 2^3 = 8$$

$$g(x) = 6.15^x$$

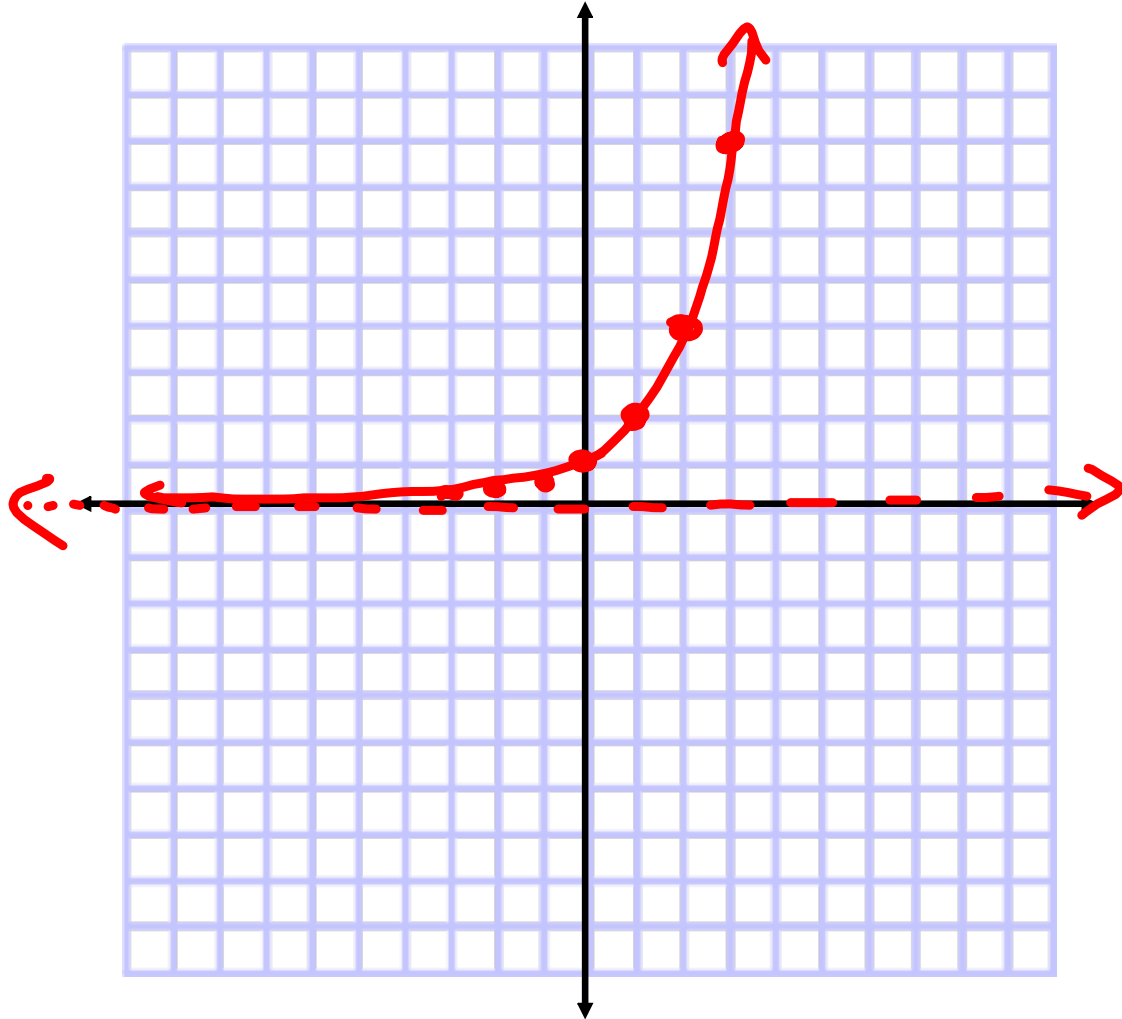
$$\text{Find } g(1.9) = 6.15^{1.9}$$

$$\approx 31.54$$

$$y = 2^x$$

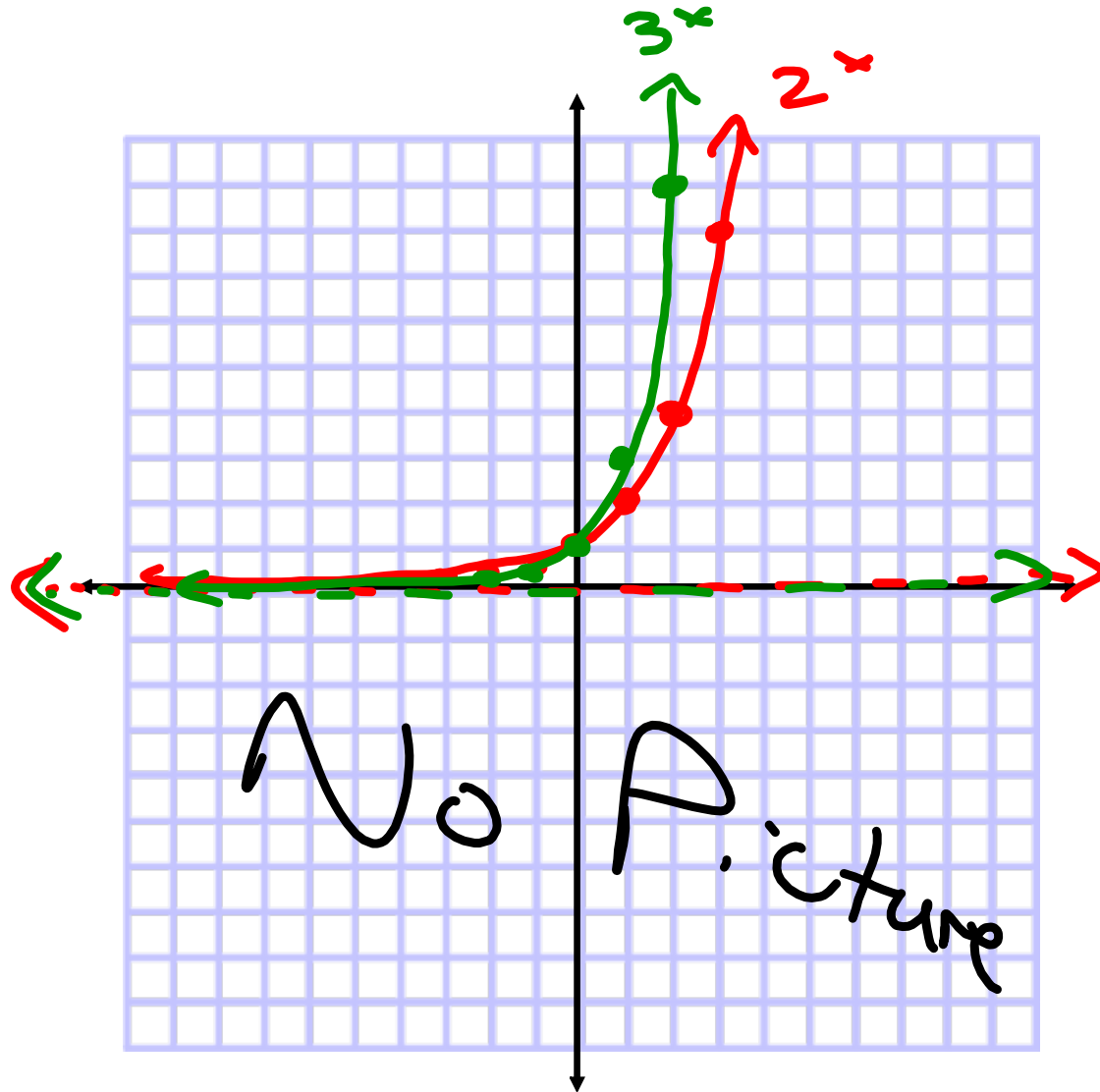
x	y
-3	$\frac{1}{8}$
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4
3	8

$$2^{-1} = \frac{1}{2^1} = \frac{1}{2}$$



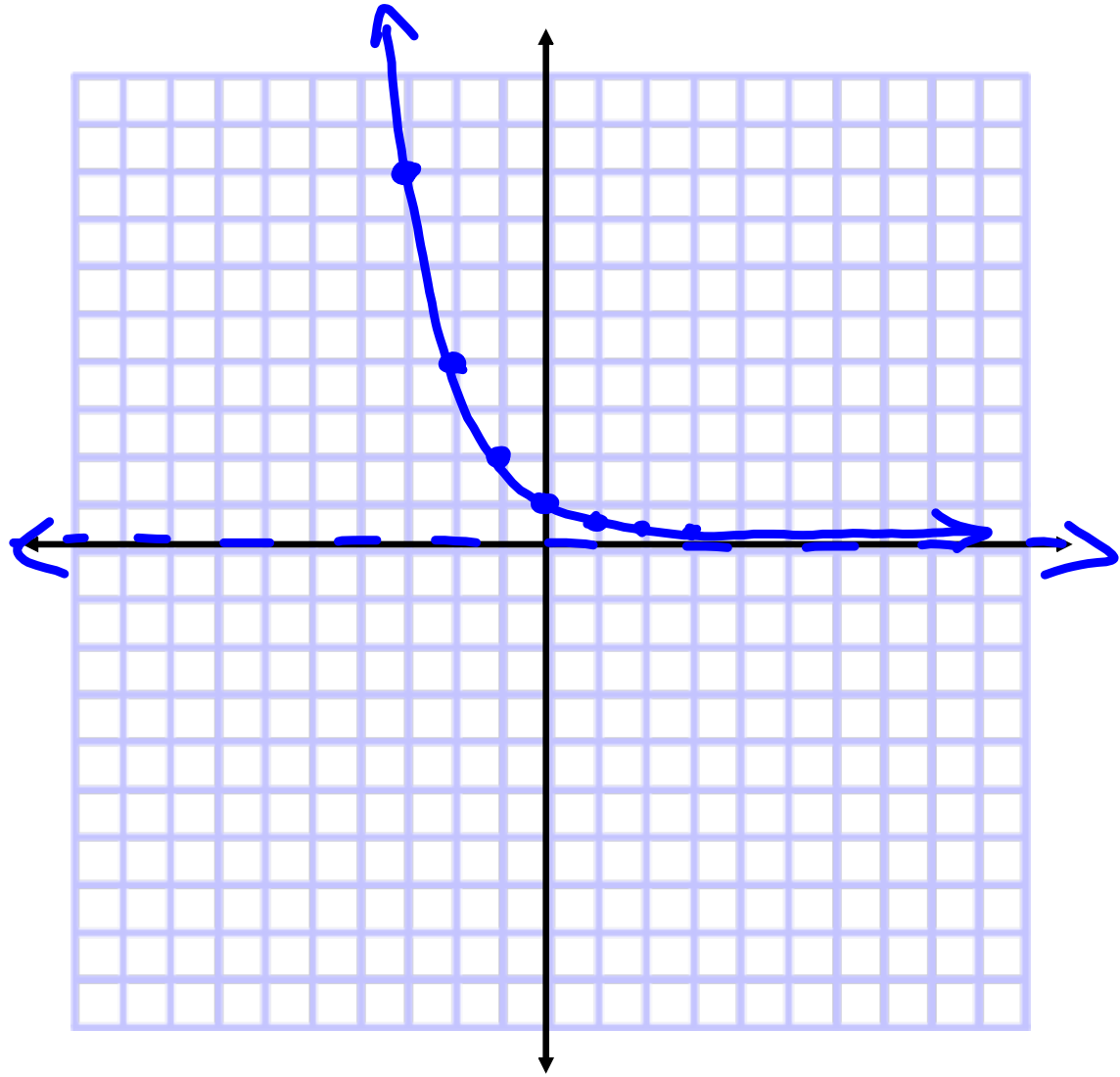
$$y = 3^x$$

x	y
2	9
1	3
0	1
-1	1/3
-2	1/9

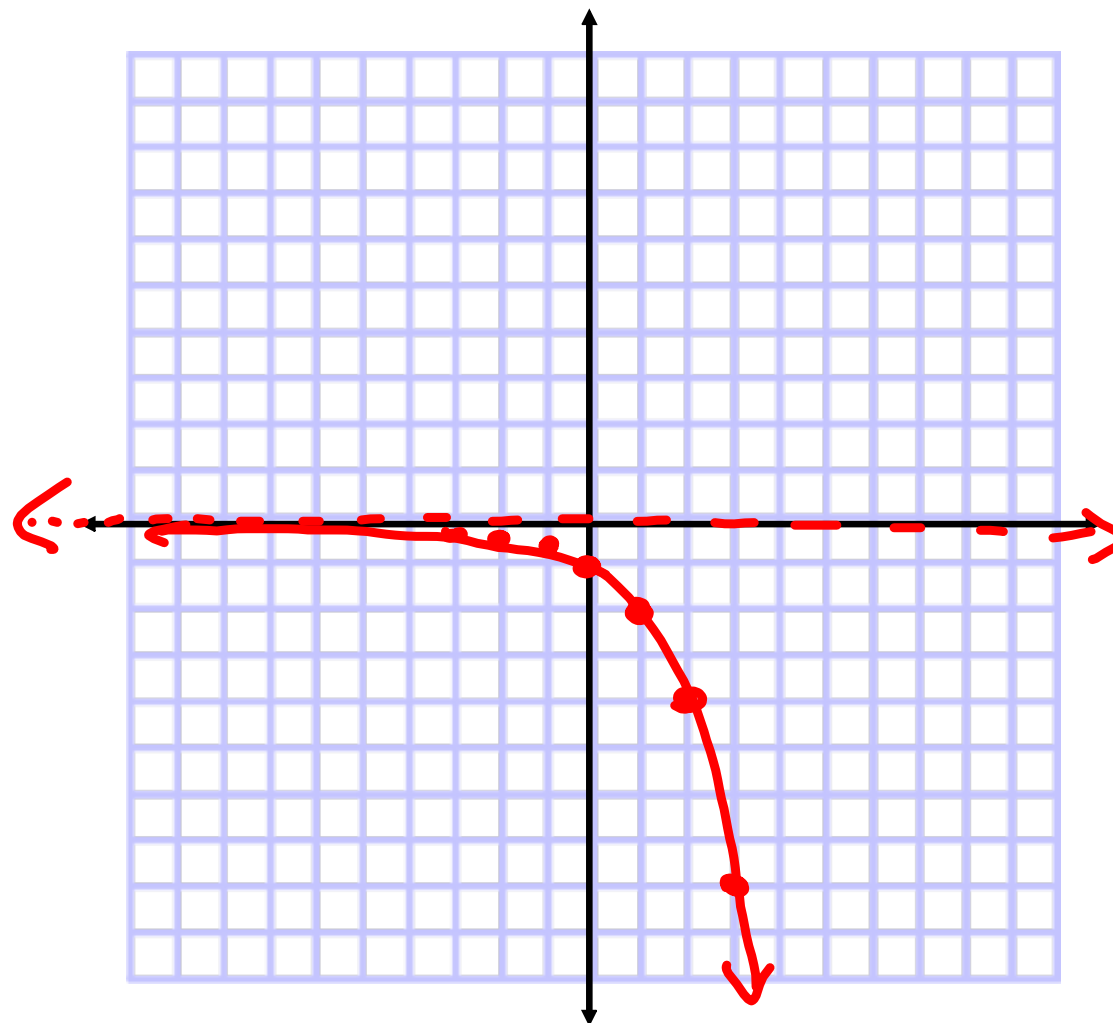


$$f = 2^{-x}$$

x	f
∞	∞
2	1/4
1	1/2
0	1
-1	2
-2	4
∞	∞



$$y = -2^x$$



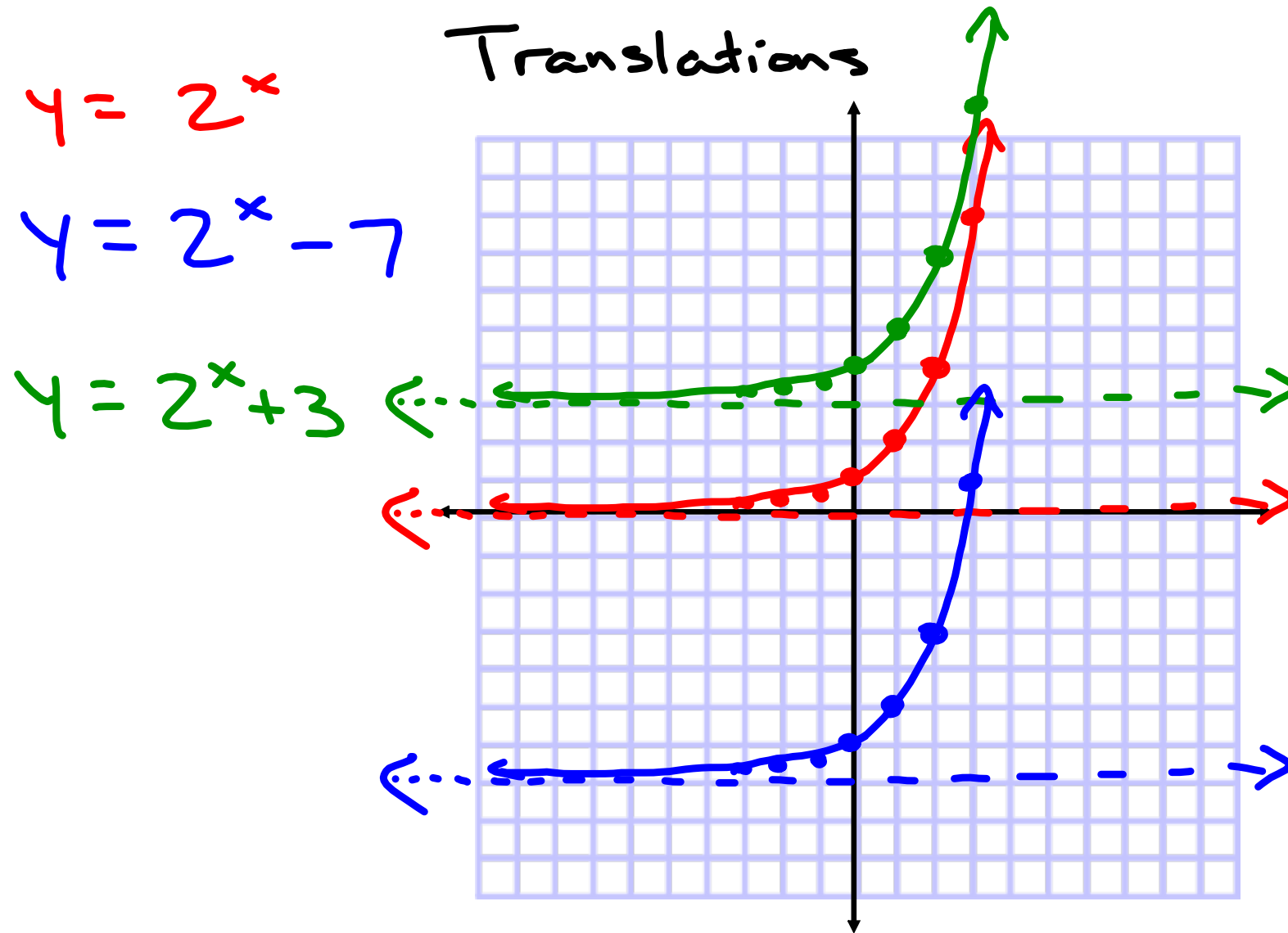
# Exponential Growth/Decay

Read Left-to-Right

Growth : Moving away from  
asymptote

Decay : Moving toward  
asymptote

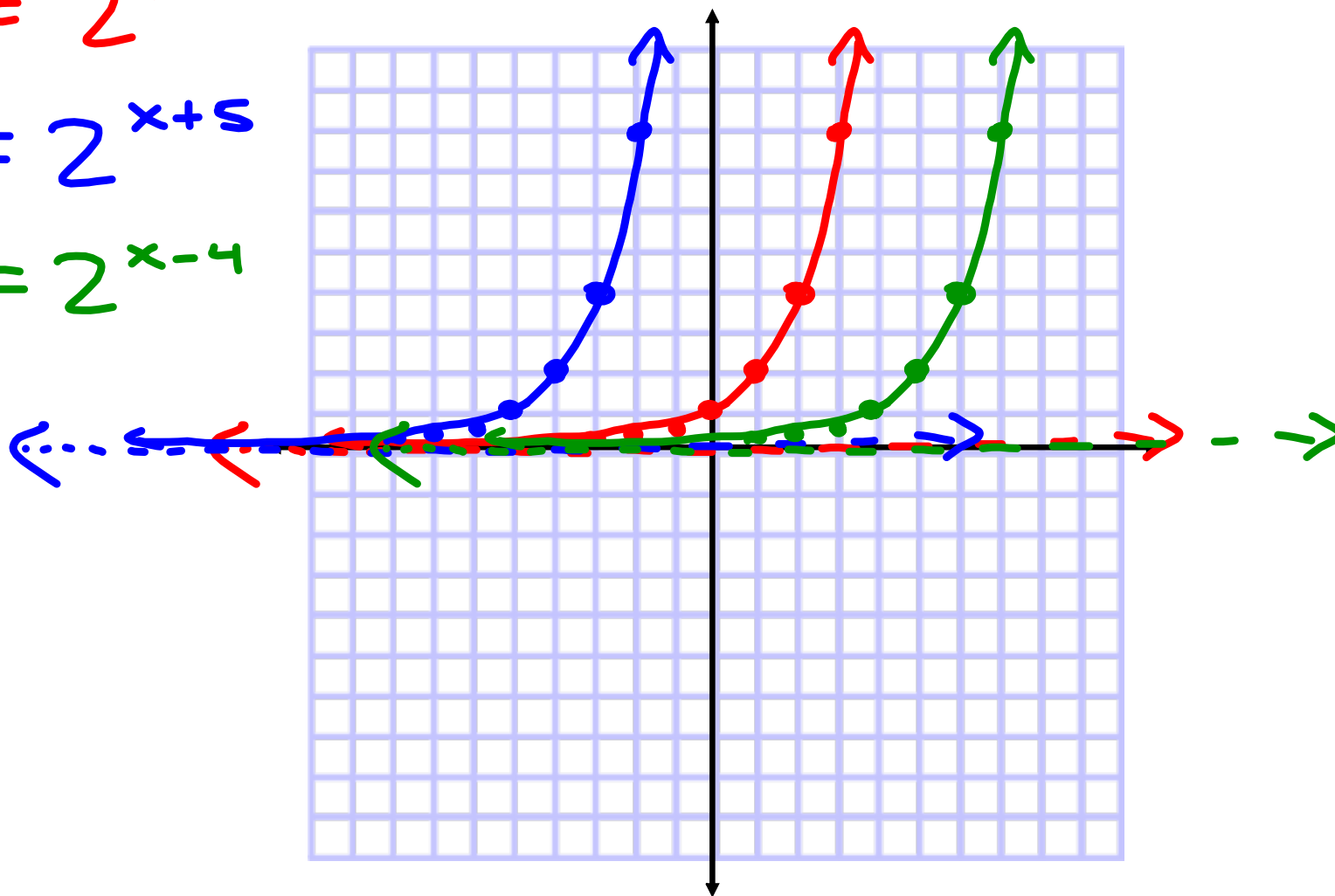




$$y = 2^x$$

$$y = 2^{x+5}$$

$$y = 2^{x-4}$$



## Applications

Ex. 8  
P. 473

$$P(t) = 1.2(2.59)^t$$

$t$  is # of years after 2003

Revenue is in millions USD

a) Initial Revenue ( $t=0$ )

$$P(0) = 1.2(2.59)^0 = \$1.2 \text{ mil}$$

b) What is Growth Factor?

Base of exp.  $GF = 2.59$

Extra { Percentage Growth:  
 $2.59 - 1.00 = 1.59 \Rightarrow 159\%$

c) Revenue in 2006? ( $t=3$ )

$$P(3) = 1.2(2.59)^3$$

$$\approx \$ 21 \text{ mil}$$

\$1800 computer. Loses 15.5% of its value each year. What is its value after 3 years?

$$\begin{aligned}V(t) &= V_0(1-l)^t \\&= 1800(1-.155)^3 \\&= 1800(.845)^3 \\&= \$1086.02\end{aligned}$$