

Chapter 8: Exponential and Logarithmic Functions

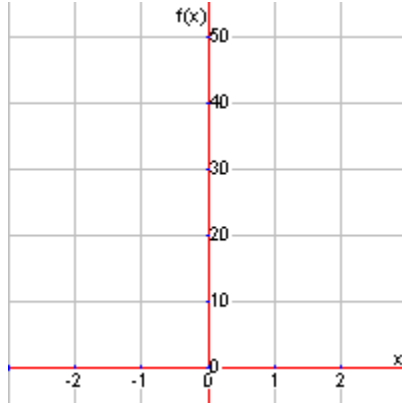
8-1 Exploring Exponential Models

Exponential Function: $y = ab^x$, $a =$

$b =$

Exponential Growth:

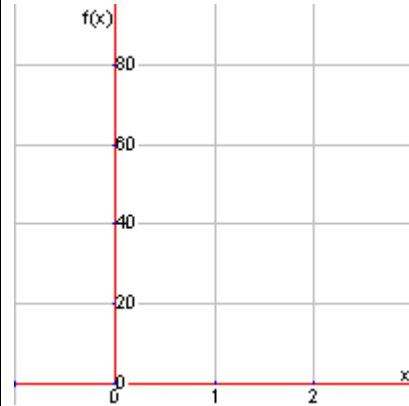
1) $f(x) = 3(4)^x$



x	y	Calculations

Exponential Decay:

2) $y = 80\left(\frac{1}{4}\right)^x$



x	y	Calculations

Determine if they are Exponential Growth or Decay:

3) $y = 8(3.5)^x$

4) $y = 0.9^x$

5) $y = \frac{1}{2}\left(\frac{5}{4}\right)^x$

6) You own a \$10,000 car and it is decreasing in value at about 15% each year.

$A = P(1 - r)^t$ $A = \text{Final Amount}$ $P = \text{Principal (Initial Amount)}$ $r = \text{rate}$ $t = \text{time (yrs)}$

a) Decay Factor b) Function c) How much is it worth in 8 years?

7) A soda presently costs \$0.50. Inflation increases the cost of things by about 3% each year. $A = P(1 + r)^t$

a) Growth Factor b) Function c) How much does it cost in 20 years?

8-3 Logarithmic & Exponential Transformations

1) $\log M = \log_{10} M$	2) $\log_b b = 1$	3) $b^{\log_b x} = x$	
1) $9^2 = 81$	2) $\frac{1}{25} = 5^{-2}$	3) $\log_4 64 = 3$	4) $\log 10,000 = 4$
5) $\log_4 16$	6) $\log_5 \left(\frac{1}{25}\right)$	7) $\log 100$	

8-4 Properties of Logarithms

1) $\log_b(MN) = \log_b M + \log_b N$	2) $\log_b \left(\frac{M}{N}\right) = \log_b M - \log_b N$	3) $\log_b M^N = N \cdot \log_b M$
1) Condense: a) $\log 7 + 3\log x - 4\log y$	b) $\frac{1}{2}(\log 25 + \log 36) - 8\log x$	
2) Expand: a) $\log_4 \left(\frac{4}{x^2 y}\right)$	b) $\log_2 3\sqrt{8a^5}$	

3) Evaluate: $2\log_2 8 - \log_2 4$

4) Given: $\log 5 \approx 0.7$ and $\log 6 \approx 0.8$
Find: $\log 150$

8-5 Exponential and Logarithmic Equations

Change of Base Formula: $\log_b M = \frac{\log M}{\log b}$

1) $2(7)^{2x-5} - 6 = 24$

2) $5^{8x-5} = 25^{3x+1}$

3) $2\log_5(3x-2) + 1 = 7$

4) $\log(2x-7) - \log 3 = 1$

8-6 Natural Logarithms $e \approx$

$$1) \ln M = \log_e M$$

$$2) \log_e e = 1$$

$$3) e^{\log_e x} = x$$

$$1) \text{ Condense: } 2 \ln 5 - \frac{1}{2} \ln x + \ln y$$

$$2) \text{ Simplify: } 3 - 4 \ln e^5$$

$$3) \ln(3n+2)^2 - 4 = 10$$

$$4) e^{5x+1} - 2 = 7$$

$$5) \ln(x+5) + \ln(x-5) = 0$$

Compounding Continuously: $A = Pe^{rt}$

6) You put \$200 in a CD and it will be worth \$300 in 4 years. What type of interest rate are you getting if interest is compounded continuously?

