

## Review (Unit 1) - Exponential and Logarithmic Functions

- Graphs of  $y = b^x$  and  $y = \log_b x$
- Create an exponential function
- Exponent Laws & Simplifying
- Solving Exponential Equations
- Understanding what "log" means
- Logarithmic Models
- Solve equations using logarithms

$$y = a(b)^x$$

initial value  $\uparrow$  growth/decay factor

$$3^{x+1} = 9^x \quad \text{or} \quad 2^x = 7$$

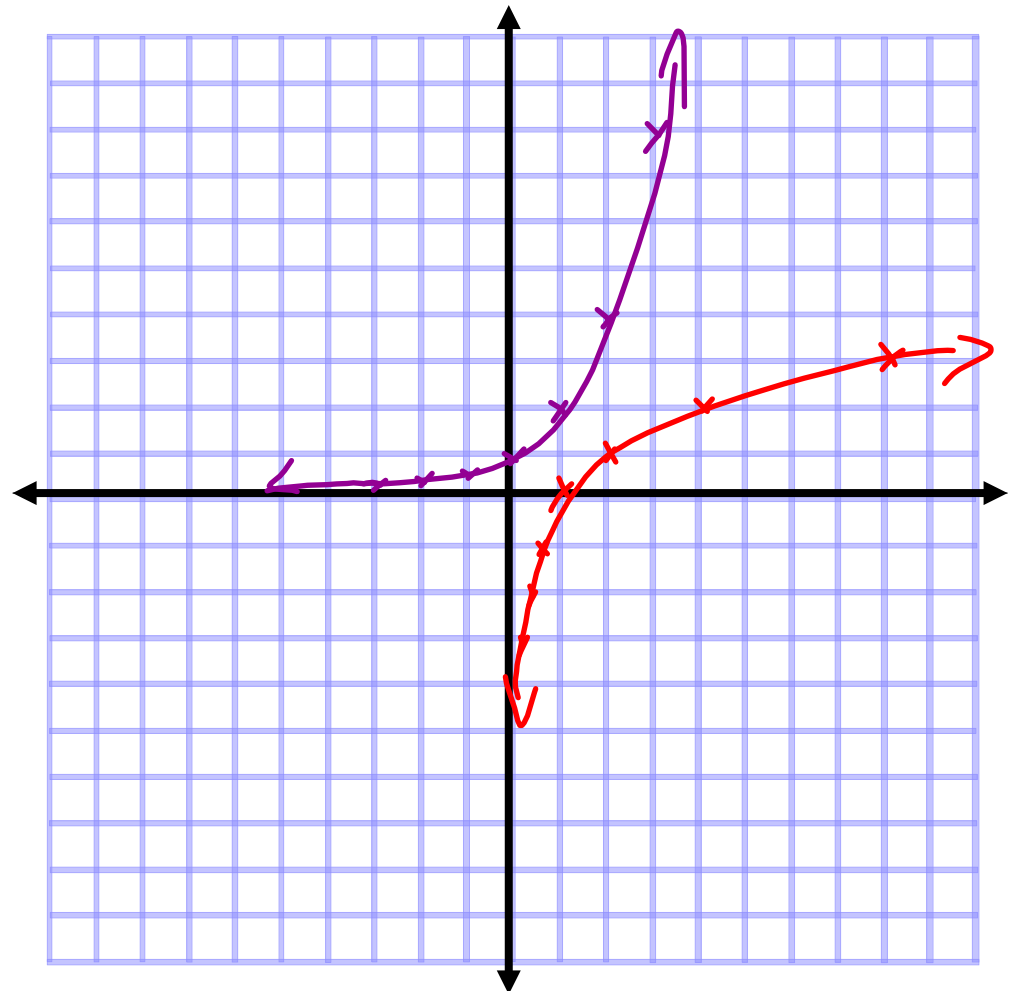
$$\log_2 16 = 4 \Leftrightarrow 2^4 = 16$$

(Richter, Decibel, pH)

Example 1: Create a table of values to sketch  $y = 2^x$  and  $y = \log_2 x$ .

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

$x$	$\log_2 x$
$\frac{1}{8}$	-3
$\frac{1}{4}$	-2
$\frac{1}{2}$	-1
1	0
2	1
4	2
8	3



Example 2: Simplify

$$a) 3^3 \times 3^4 = 3^7$$

$$b) 3^9 \div 3^5 = 3^4$$

$$c) (3^2)^4 = 3^8$$

$$d) 3^0 = 1$$

$$e) 3^{-4} = \frac{1}{3^4}$$

$$f) \frac{3^2 \times 3^4}{(3^2)^5} = \frac{3^6}{3^{10}} = 3^{-4} = \frac{1}{3^4}$$

Example 3: Solve for x

$$4^{x+3} = 8^{x-1}$$
$$(2^2)^{x+3} = (2^3)^{x-1}$$
$$2^{2x+6} = 2^{3x-3}$$

$$2x+6 = 3x-3$$

$-2x \quad +3 \quad -2x \quad +3$

$$\boxed{9 = x}$$

$$2^{x+3} = 14$$

$$\log(2^{x+3}) = \log 14$$

$$(x+3) \frac{\log 2}{\log 2} = \frac{\log 14}{\log 2}$$

$$x+3 = 3.81$$

$-3 \quad -3$

$$\boxed{x = 0.81}$$

Example 4: An investment of \$1500 grows at a rate of 2.6% per year. Determine...

(a) the amount of the investment after 5 years.

(b) how long it takes the investment to double.

Growth factor:

$$100\% + 2.6\%$$

$$= 102.6\%$$

$$b = 1.026$$

$$a) A = 1500(1.026)^x$$

$$A = 1500(1.026)^5 \\ = \$1705.41$$

$$b) A = 1500(1.026)^x \\ \frac{3000}{1500} = \frac{1500(1.026)^x}{1500}$$

$$2 = 1.026^x$$

$$\log 2 = \log(1.026^x)$$

$$\frac{\log 2}{\log 1.026} = x \frac{\log 1.026}{\log 1.026}$$

$$27 = x$$

Review: pg. 156 # 4, 5, 19 - 21, 34, 35

## Exam Format

Part A M/C

30

Part B Definition  
Matching

10

Part C Problem Solving  
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80