MHF4U_2011: Advanced Functions, Grade 12, University Preparation

Unit 3: Exponential and Logarithmic Functions

Activity 1: Pre-Requisite Skills and Introduction to Logarithmic Functions

Formative Assignment

1. Convert the following into logarithmic form:

a. $32 = 2^5$	b. $27^{\frac{2}{3}} = 9$	c. $81^{\frac{3}{4}} = 27$

2. Write the following in exponential form:

a. $\log_3 81 = 4$	b. $\log_2\left[\frac{1}{4}\right] = -2$	c. $\log 100000 = 5$

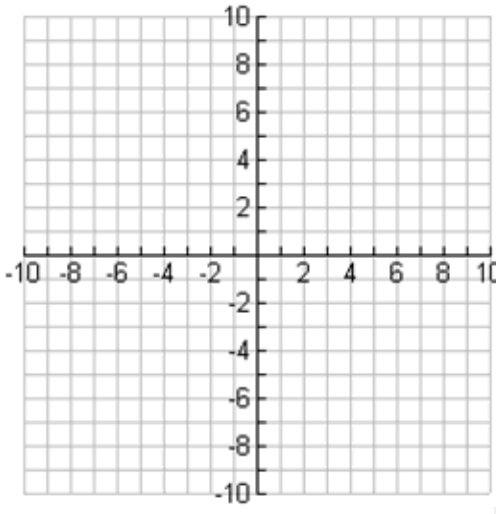
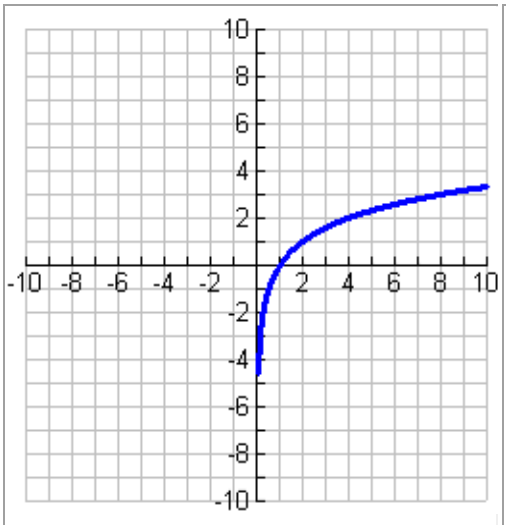
3. Solve for x for each of the following:

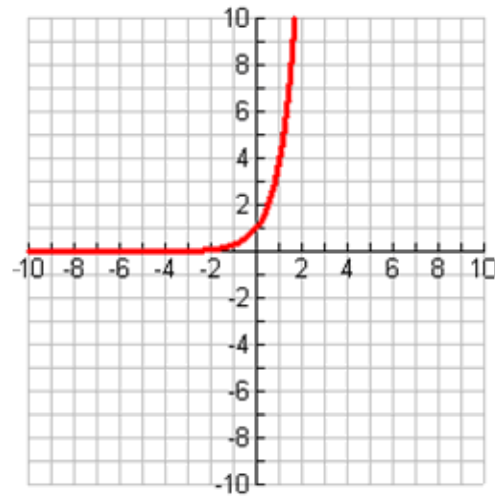
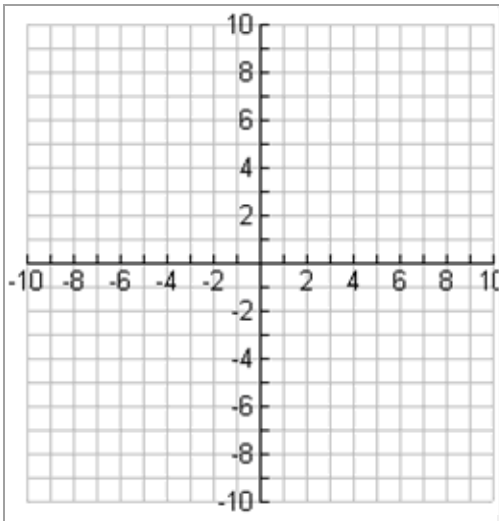
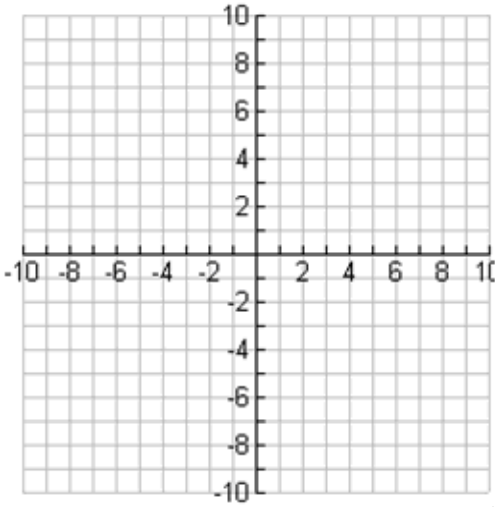
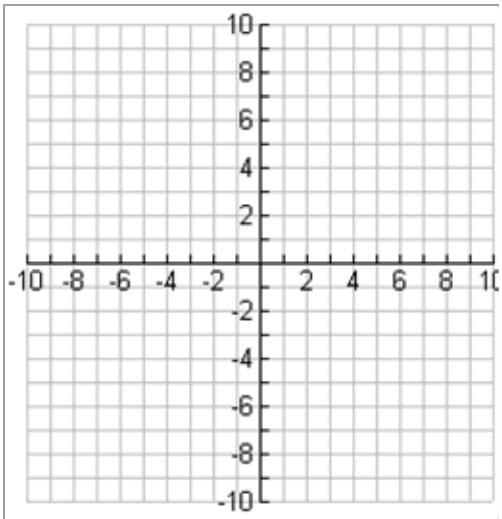
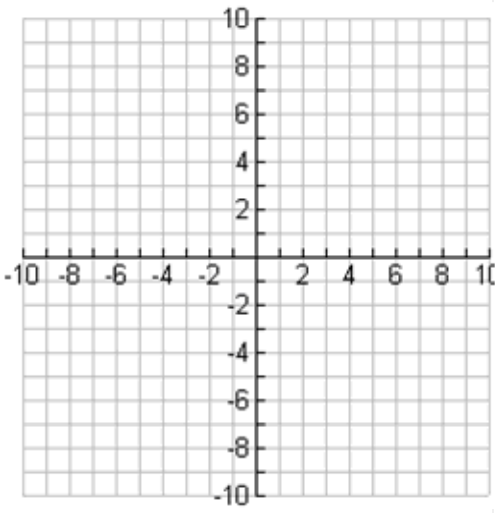
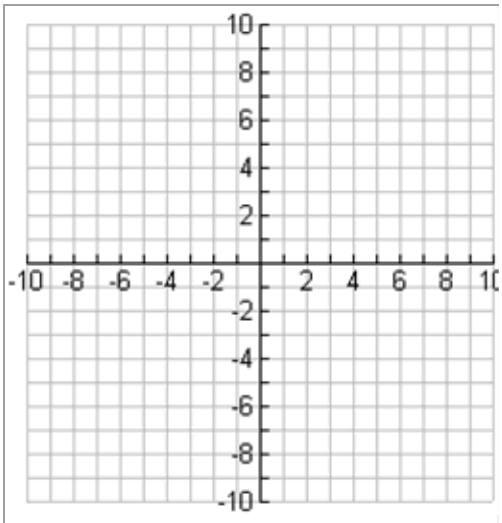
a. $\log_5 25 = x$	b. $\log_4\left[\frac{1}{64}\right] = x$	c. $\log_{\frac{1}{4}} x = -2$	d. $\log_x 27 = -3$

4. Evaluate each logarithm below:

a. $\log_2 2^5$	b. $\log 10^4$	c. $\log_3 3^{-4}$

5. Fill in the table below using inverse functions :

Graph of Exponential Form	Equation in Exponential Form	Graph of Logarithmic Form	Logarithmic Form
			$y = \log_2 x$

Graph of Exponential Form	Equation in Exponential Form	Graph of Logarithmic Form	Logarithmic Form
	$y = 4^x$		
	$y = (1/2)^x$		
			$y = \log_3 x$

Formative Assignment - SOLUTIONS

1. Convert the following into logarithmic form:

a. $32 = 2^5$ $\log_2 32 = 5$	b. $27^{\frac{2}{3}} = 9$ $\log_{27} 9 = \frac{2}{3}$	c. $81^{\frac{3}{4}} = 27$ $\log_{81} 27 = \frac{3}{4}$

2. Write the following in exponential form:

a. $\log_3 81 = 4$ $3^4 = 81$	b. $\log_2\left[\frac{1}{4}\right] = -2$ $2^{-2} = \frac{1}{4}$	c. $\log 100000 = 5$ $10^5 = 100000$

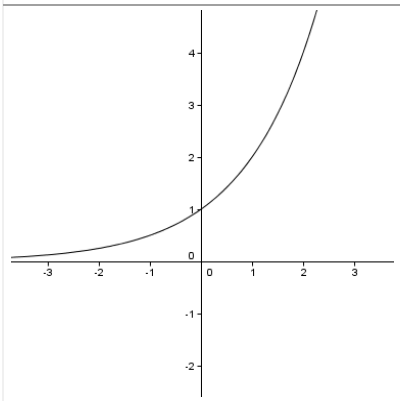
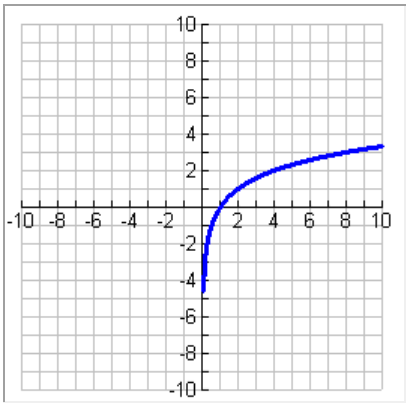
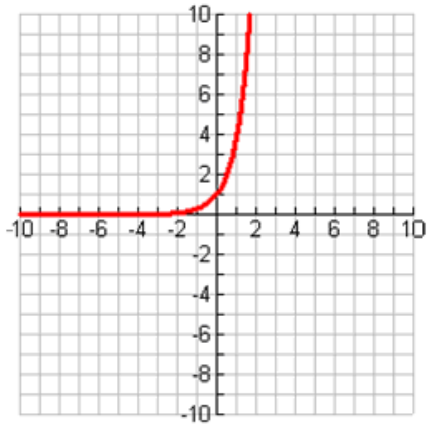
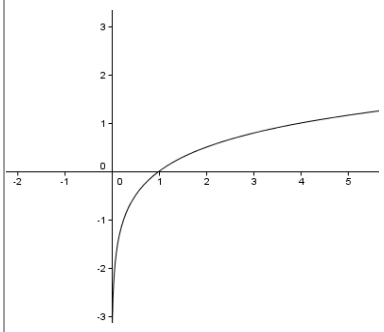
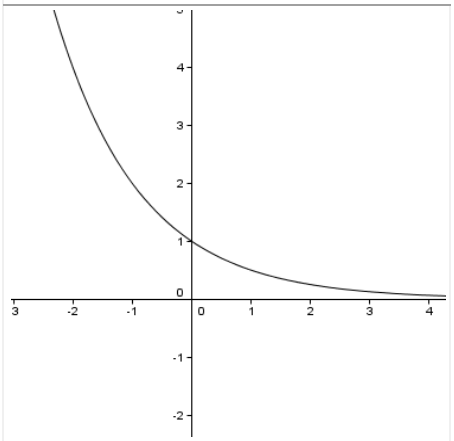
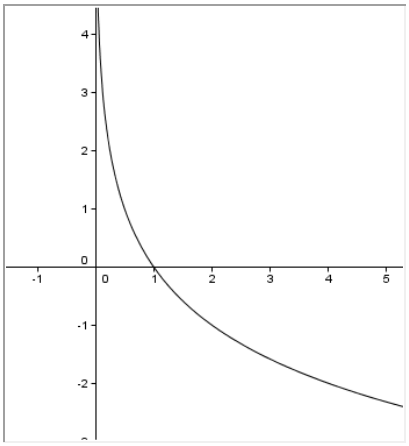
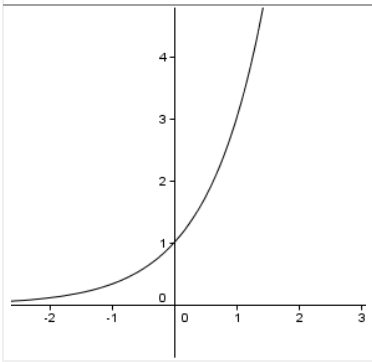
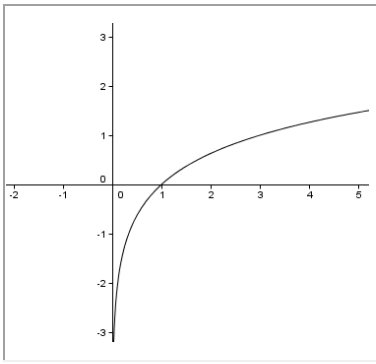
3. Solve for x for each of the following:

a. $\log_5 25 = x$ $5^x = 25$ $5^x = 5^2$ $x = 2$	b. $\log_4\left[\frac{1}{64}\right] = x$ $4^x = \frac{1}{64}$ $4^x = 4^{-3}$ $x = -3$	c. $\log_{\frac{1}{4}} x = -2$ $\left(\frac{1}{4}\right)^{-2} = x$ $4^2 = x$ $16 = x$	d. $\log_x 27 = -3$ $x^{-3} = 27$ $\left(\frac{1}{x}\right)^3 = 27$ $\frac{1}{x^3} = \frac{27}{1}$ $x^3 = \frac{1}{27}$ $x = \sqrt[3]{\frac{1}{27}}$ $x = \frac{1}{3}$

4. Evaluate each logarithm below:

a. $\log_2 2^5$ $= 5$	b. $\log 10^4$ $= 4$ this is a log of base 10.	c. $\log_3 3^{-4}$ $= -4$

5. Fill in the table below:

Graph of Exponential Form	Equation in Exponential Form	Graph of Logarithmic Form	Logarithmic Form
	$y = 2^x$		$y = \log_2 x$
	$y = 4^x$		$y = \log_4 x$
	$y = (1/2)^x$		$y = \log_{\frac{1}{2}} x$
	$y = 3^x$		$y = \log_3 x$