4.3 Logarithmic Functions

CLASSROOM EXAMPLE 1 Writing Equivalent Logarithmic and Exponential Forms

	Logarithmic Form	Exponential Form
(a)		$3^4 = 81$
(b)	$\log_{1/2} 8 = -3$	
(c)		$10^3 = 1000$
(d)	$\log_5 \dfrac{1}{125} = -3$	
(e)		$9^0 = 1$
(f)	$\log_6 1 = 0$	

Logarithmic Equations

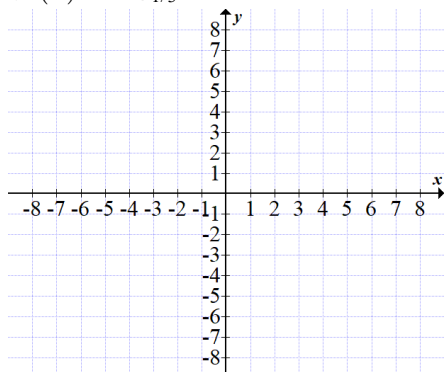## CLASSROOM EXAMPLE 2 Solving Logarithmic Equations

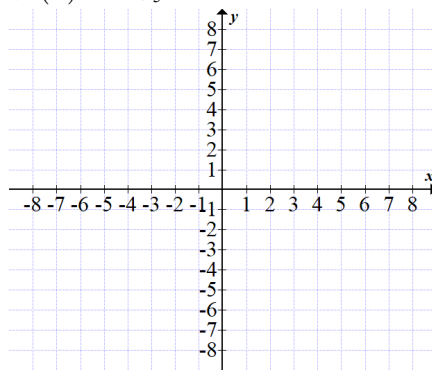**(a)** $\log_x \dfrac{16}{9} = -2$

(b) $\log_{16} x = \dfrac{3}{4}$

(c) $\log_{36} \sqrt{6} = x$

CLASSROOM EXAMPLE 3 Graphing Logarithmic Functions
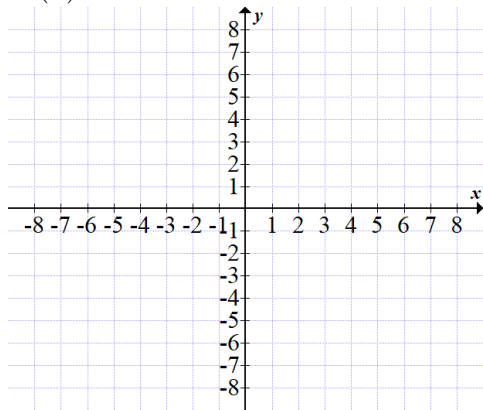
(a) $f(x) = \log_{1/3} x$
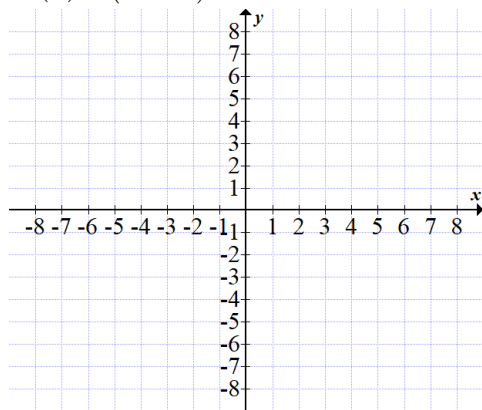

(b) $f(x) = \log_5 x$

CLASSROOM EXAMPLE 4 Graphing Translated Logarithmic Functions

(a) $f(x) = \log_2(x+2)$

(b) $f(x) = (\log_4 x) + 2$

CLASSROOM EXAMPLE 5 Using Properties of Logarithms

(a) $\log_7(8 \cdot 6)$

(b) $\log_6 \dfrac{12}{5}$

(c) $\log_2 \sqrt[3]{9}$

CLASSROOM EXAMPLE 6 Using Properties of Logarithms

Write each expression as a single logarithm with coefficient 1.

(a) $\log_4 x - \log_4 y + \log_4 z$

(b) $4\log_b r - 5\log_b s$

(c) $\dfrac{1}{3}\log_a x + \dfrac{2}{3}\log_a y - \log_a xy$