

AA PREP—INTRODUCTION TO LOGARITHMS—WORKSHEET 2

KEY

1. Solve for x.

a) $5^x = 125$
 $5^x = 5^3$
 $x = 3$

b) $\left(\frac{1}{5}\right)^x = 25$
 $5^{-1x} = 5^2$
 $-\cancel{x} = \frac{2}{-1}$
 $x = -2$

c) $\left(\frac{1}{25}\right)^{x-3} = 125^{-2x}$
 $5^{-2(x-3)} = 5^3(-2x)$
 $-2(x-3) = 3(-2x)$
 $-2x+6 = -6x$
 $+2x = -4x$
 $6 = -4x$
 $-\frac{6}{4} = -x$
 $x = \frac{3}{2}$

d) $5^x = 100$ (estimate)
 $5^2 = 25$
 $5^3 = 125$
 $\rightarrow x$ IS BETWEEN 2 AND 3.
 $x \approx 2.9$

2. Write the exponential equation in logarithmic form.

a) $3^{-4} = \frac{1}{81}$
 $\log_3 \frac{1}{81} = -4$

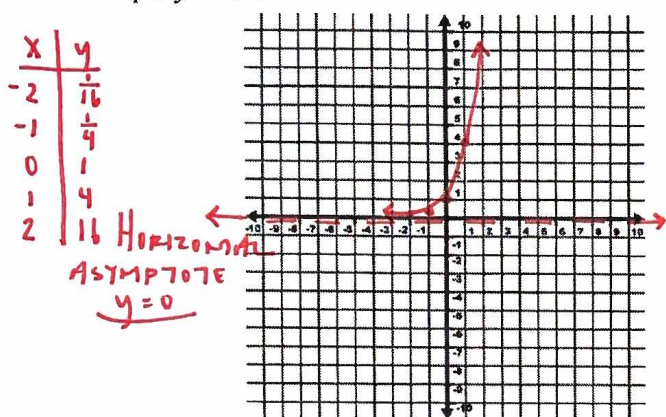
b) $1 = 12^0$
 $\log_{12} 1 = 0$

3. Write the logarithmic equation in exponential form.

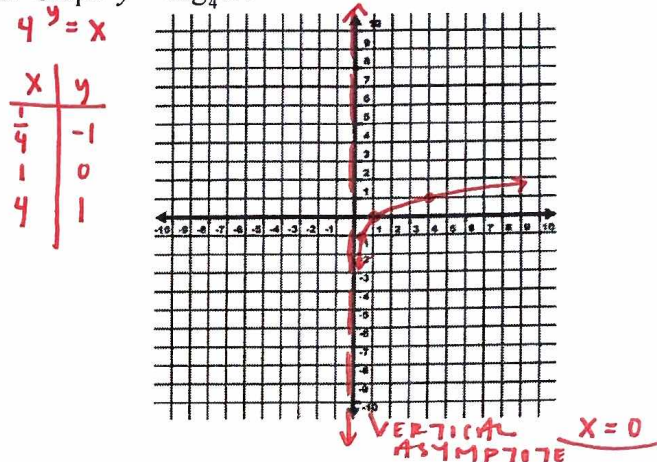
a) $\log_{64} 4 = \frac{1}{3}$
 $64^{\frac{1}{3}} = 4$

b) $-\frac{1}{2} = \log_{81} \frac{1}{9}$
 $81^{-\frac{1}{2}} = \frac{1}{9}$

4. Graph $y = 4^x$.



5. Graph $y = \log_4 x$.



6. Evaluate.

a) $\log_8 8$ $8^x = 8$ 1	b) $\log_8 1$ $8^x = 1$ 0
c) $\log_8 \frac{1}{64}$ $8^x = \frac{1}{64}$ -2	d) $\log_{512} 64$ $512^x = 64$ $8^{3x} = 8^2$ $\frac{3}{1}x = \frac{2}{3}$ $\frac{2}{3}$

7. Solve for x.

a) $\log_{1000} x = -\frac{1}{3}$ $1000^{-\frac{1}{3}} = x$ $\sqrt[3]{1000^{-1}} = x$ $10^{-1} = x$ $x = \frac{1}{10}$	b) $\log_{64} \frac{1}{16} = x$ $64^x = \frac{1}{16}$ $4^{3x} = 4^{-2}$ $\frac{3}{1}x = \frac{-2}{3}$ $x = -\frac{2}{9}$
c) $\log_x 5 = \frac{1}{3}$ $(x^{\frac{1}{3}})^3 = (5)^3$ $x = 125$	d) $\log_x \frac{1}{81} = 4$ $\sqrt[4]{x^4} = \sqrt[4]{\frac{1}{81}} = \frac{\sqrt[4]{1}}{\sqrt[4]{81}} = \frac{1}{3}$ $x = \frac{1}{3}$