AA PREP—INTRODUCTION TO LOGARITHMS—WORKSHEET 1 KEY

1. Solve for x.

a) $4^x = 16$

$4^x = 4^2$

$x = 2$

b) $\left(\frac{1}{4}\right)^x = 64$

$4^{-1x} = 4^3$

$\frac{-1x}{-1} = \frac{3}{-1}$

$x = -3$

c) $\left(\frac{1}{64}\right)^{x-2} = 16^{-4x}$

$4^{-3(x-2)} = 4^{2(-4x)}$

$-3(x-2) = 2(-4x)$

$-3x + 6 = -8x$

$+3x \quad +3x$

$\frac{6}{-5} = \frac{5x}{-5}$

$x = -\frac{6}{5}$

d) $4^x = 50$ (estimate)

$4^2 = 16$

$4^3 = 64$

x IS BETWEEN 2 AND 3

$x \approx 2.8$

2. Write the exponential equation in logarithmic form.

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

$\log_4 \frac{1}{64} = -3$

b) $2 = 4^{\frac{1}{2}}$

$\log_4 2 = \frac{1}{2}$

3. Write the logarithmic equation in exponential form.

a) $\log_7 1 = 0$

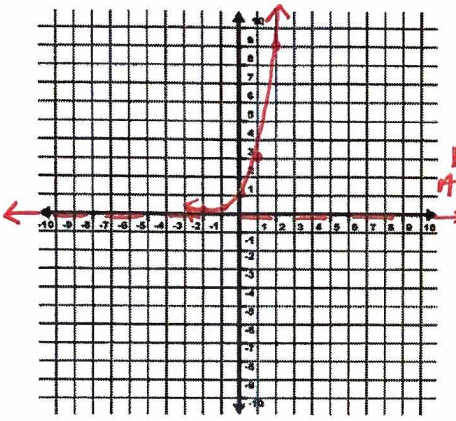
$7^0 = 1$

b) $\frac{1}{3} = \log_{27} 3$

$27^{\frac{1}{3}} = 3$

4. Graph $y = 3^x$.

x	y
-2	$\frac{1}{9}$
-1	$\frac{1}{3}$
0	1
1	3
2	9

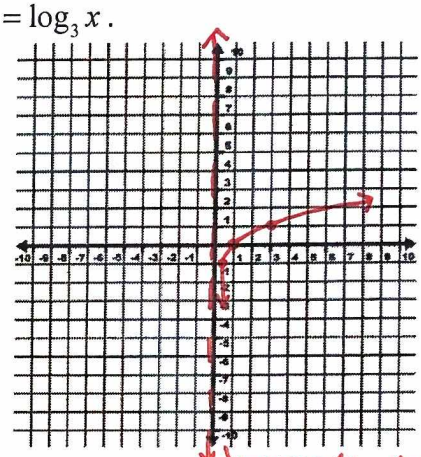


HORIZONTAL ASYMPTOTE $y = 0$

5. Graph $y = \log_3 x$.

$3^y = x$

x	y
$\frac{1}{3}$	-1
1	0
3	1



VERTICAL ASYMPTOTE $x = 0$

6. Evaluate.

a) $\log_5 1$ $\quad 5^x = 1$ $\quad$ 0	b) $\log_5 5$ $\quad 5^x = 5$ $\quad$ 1
c) $\log_{25} 5$ $\quad 25^x = 5$ $\quad \frac{1}{2}$	d) $\log_5 \frac{1}{125}$ $\quad 5^x = \frac{1}{125}$ $\quad -3$

7. Solve for x.

a) $\log_{27} x = -\frac{1}{3}$ $\quad 27^{-\frac{1}{3}} = x$ $\quad \sqrt[3]{27}^{-1} = x$ $\quad 3^{-1} = x$ $\quad x = \frac{1}{3}$	b) $\log_{16} 64 = x$ $\quad 16^x = 64$ $\quad 4^{2x} = 4^3$ $\quad \frac{2x}{2} = \frac{3}{2}$ $\quad x = \frac{3}{2}$
c) $\log_x 4 = \frac{1}{2}$ $\quad \left(x^{\frac{1}{2}}\right)^2 = (4)^2$ $\quad x = 16$	d) $\log_8 \frac{1}{4} = x$ $\quad 8^x = \frac{1}{4}$ $\quad 2^{3x} = 2^{-2}$ $\quad \frac{3x}{3} = \frac{-2}{3}$ $\quad x = -\frac{2}{3}$