5.2.2   What is a logarithm?

Defining the Inverse of an Exponential Function

#63 Another Ancient Puzzle

Fill in the table with your teammates

| x	8	32	$\frac{1}{2}$	1	16	4	3	64	2	0	0.25	-1	$\sqrt{2}$	0.2	$\frac{1}{8}$
$g(x)$	3		-1					6							

a. Describe an equation that relates x and $g(x)$.

b. Look back at the Ancient Puzzle in problem #54. If you have not already done so, use the idea of the Ancient Puzzle to write an equation for $g(x)$.

c. Why is it difficult to think of an output for the input of 0 or –1?

d. What is the output for $x = 25$, to the nearest hundredth?

e. Using your graphing calculator, graph $y = 2^x$ and $y = \log_2(x)$. Carefully copy the graph here. How do the graphs compare? What do they have in common? What is different?
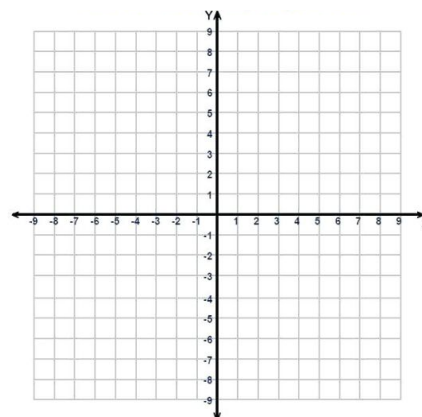
#65 Calculate each of the values below, then justify your answers by writing the equivalent exponential form.

a. $\log_2(32) = ?$ Exponential Form:	b. $\log_2\left(\frac{1}{2}\right) = ?$ Exponential Form:
c. $\log_2(4) = ?$ Exponential Form:	d. $\log_2(0) = ?$ Exponential Form:
e. $\log_2(?) = 3$ Exponential Form:	f. $\log_2(?) = \frac{1}{2}$ Exponential Form:

Review Practice:

1) Given $f(x) = 2(x-1)^3 + 4$,

    a. Write the equation for $f^{-1}(x)$.

    b. Make a table for $f(x)$ and $f^{-1}(x)$.

$f(x) \dfrac{x}{y}$ | $f^{-1}(x) \dfrac{x}{y}$ |

    c. Graph $f(x)$ and $f^{-1}(x)$ on the same set of axes.