## Lesson 6.2.1

## 6-88. See below:

a. A $\log$ is the inverse of an exponential, since $b^{y}=x$ can be rewritten as $y=\log _{b} x$, which is the inverse of $y=b^{x}$.
b. It uses a base of 10 only.
c. $y=a \log (x-h)+k$

## 6-89. See below:

a. Instead of being a $\log$ graph, $y=\log \left(2^{x}\right)$ is linear.
b. $y=\log _{2} x$ converts to $x=2^{y}$, while $y=\log \left(2^{x}\right)$ converts to $2^{x}=10^{y}$, and those functions are not equivalent.

## 6-90. See below:

a. false $\left(2 \neq \frac{1}{2}\right)$
b. false (students could use a counterexample)
c. true (most students will give examples, but the proof will come later)
d. false (students could use a counterexample)

## 6-91. See below:

a. Statements should follow the form of the Power Property of Logarithms, $\log \left(b^{x}\right)=x(\log b)$.
b. Statements should follow the form of the Power Property of Logarithms, $\log \left(b^{x}\right)=x(\log b)$.

6-92. Before this lesson, the only method students had was Guess and Check.

## 6-93. See below:

a. The fact that the $x$ is in the exponent and the bases are not the same.
b. You can write $\log 2=\log 1.04^{x}$ so $\log 2=x \log 1.04$ and you can solve this version.
c. $x \approx 17.673$

## 6-94. See below:

a. $x \approx 1.985$
b. $x \approx 1.838$
c. $x=2$
d. $x \approx 1.682$


6-95. See answers in bold in the table below. $y=3^{x}$

| $x$ | $y$ |
| :---: | :---: |
| $\mathbf{0}$ | 1 |
| $\mathbf{1}$ | 3 |
| 2 | 9 |
| $\mathbf{3}$ | 27 |
| 4 | $\mathbf{8 1}$ |
| $\mathbf{5}$ | 243 |
| 6 | 729 |
| 7 | 2187 |
| 8 | $\mathbf{6 5 6 1}$ |

6-96. In $2=1.04^{x}$ the variable is the exponent, but in $56=x^{8}$ the exponent is known so you can take the $8^{\text {th }}$ root.

6-97. $x>100$, because $10^{2}=100$.

6-98. Answers vary but students should recognize that $0<b<1$.

## 6-99. See below:

a. $\frac{1}{8}$
b. $\frac{1}{x}$
c. $m \approx 1.586$
d. $n=2.587$
e. Answers vary. $x=b^{1 / a}$

6-100. $2^{1 / 2}=\sqrt{2}$ and $2^{-1}=\frac{1}{2}$

## 6-101. See below:

a. $-3<x<3$
b. $-2<x<1$
c. $x \leq-2$ or $x \geq 1$

## 6-102. See below:

a. Yes.
b. See graph below, (it is not a function).

c. Not necessarily.
d. Functions that have inverse functions have no repeated outputs; a horizontal line can intersect the graph in no more than one place.
e. Yes; for example, a sleeping parabola is not a function, but its inverse is a function.

6-103. See below:
a. $x=-3, y=5, z=10$
b. There are infinitely many solutions.
c. The planes intersect in a line.

