

## Variable Exponential Equations Without A Common Base

Solve each of the following and round to the nearest hundredth if necessary:

1.  $10^x = 182$

$$\frac{x \log 10 = \log 182}{\log 10 \quad \log 10}$$

$$x = 2.26$$

2.  $15^{2n-3} = 245$

$$\frac{(2n-3) \log 15 = \log 245}{\log 15 \quad \log 15}$$

$$2n-3 = 2.03$$

$$\begin{matrix} +3 & +3 \end{matrix}$$

$$\frac{2n = 5.03}{2}$$

$$n = 2.52$$

3.  $3(5)^{2x} = 60$

$$\frac{2 \log 5 = \log 20}{2 \log 5 \quad 2 \log 5}$$

$$x = 0.93$$

4.  $4^x - 8 = 12$

$$\frac{x \log 4 = \log 17}{\log 4 \quad \log 4}$$

$$x = 2.04$$

5.  $8 - 2(4)^{x-5} = 14$

$$\frac{-2 \log 4 = \log 6}{-2 \log 4 \quad -2}$$

$$\log 4^{x-5} = -3$$

$$\frac{(x-5) \log 4 = \log 3}{\log 4 \quad \log 4}$$

$$x-5 = \text{Error}$$

No Solution

6.  $1 - 2(3)^{2x} = -5$

$$\frac{-2 \log 3 = \log 3}{-2 \log 3 \quad -2}$$

$$\log 3^{2x} = 3$$

$$\frac{2 \log 3 = \log 3}{\log 3 \quad \log 3}$$

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

$$x = 1/2$$

7.  $2(3)^{x+1} + 8 = 18$

$$\frac{2 \log 3 = \log 5}{\log 3 \quad \log 3}$$

$$(x+1) \log 3 = \log 5$$

$$\frac{x+1 = 1.464}{+1 \quad -1}$$

$$x = 0.46$$

8.  $4(2)^{2x} + 3 = 15$

$$\frac{4 \log 2 = \log 3}{2 \log 2 \quad 2 \log 2}$$

$$x = 0.79$$

