

Sec 5.7 – Exponential & Logarithmic Functions
(Solving Exponential Equations)

Name: _____

1. Solve the following **basic** exponential equations by rewriting each side using the same base.

a. $3^{x-1} = 81$

b. $2^{2x-3} = 128$

c. $2^{2x-1} = 4^3$

2. Solve the following **basic** exponential equation by rewriting each as logarithmic equation and approximating the value of x.

a. $4^x = 102$

b. $5^{2x-3} = 1953125$

c. $e^{2x} = 78$

3. Solve the following exponential equation by rewriting each as logarithmic equation and approximating the value of x.

a. $6^{2x} - 8 = 112$

b. $2 \cdot 3^{x-3} + 1 = 39367$

c. $3e^{2x} + 2 = 92$

d. $2 \cdot 4^{2x+1} + 40 = 8$

4. Solve the following exponential inequalities.

a. $3^x - 7 > 20$



c. $2e^{2x} + 1 < 33$



b. $5^{x-3} \geq -40$



d. $5 \cdot 4^{2x+1} - 2 \geq 243$



5. Solve the following applications

- a. Create an equation that represents the value P of an investment t years after the initial investment. The initial investment was \$3200 and increases by 12% each year (compounded annually). This would suggest that the account value could be modeled by $P = 3200(1.12)^t$. Determine how many years it should take for the investment to double in value.

- b. There are 15 virus particles known as a virion in a host and the number of virions doubles every hour and continues this model for the first 28 hours. The number of N virion after t hours can be found using the formula $N = 15 \cdot (2^t)$. How long will it take approximately for there to be 4,500,000 virions living in the host?



- c. There are initially 8 frogs living in a pond in the back of a farm. The number frogs can be described by the formula $P = 8 \cdot e^{(0.2t)}$. How many years will it take for the population of frogs to grow to 100 if the model continues?

