Name: ______________________________ Date: ________________________

7.1 Equivalent Forms of Exponential Equations

BLM 7–2

1. Write each expression as a power of the base indicated.

a) 64^3, base 4

b) $\left(\frac{1}{4}\right)^5$, base 2

c) 5^3, base 4

2. Write each expression as a single power of 3.

a) $\sqrt[3]{81}$

b) $\frac{\sqrt{27}}{\sqrt[4]{9}}$

3. Solve. Check your answers by using graphing technology.

a) $7^x = 49^{x+5}$

b) $4^{t-3} = 32^{\frac{t+2}{3}}$

c) $36^{3x-1} = 216^{5-x}$

4. Consider the equation $5^{3x-1} = 125^{2x}$.

a) Solve this equation by expressing both sides as powers of a common base.

b) Solve the same equation by taking the logarithm, base 5, of each side.

5. Solve $\left(\sqrt{125}\right)^{x-3} = 25^{2-x}$. Check your answer using graphing technology.

6. **a)** Solve. Give exact answers.

i) $5 = 10^x$

ii) $3 = 10^x$

iii) $7 = 10^x$

b) Use your answers to part a) to state a formula that could be used to solve $b = 10^x$ for *x*.

7. **a)** Solve $16^{3x+2} = 64^{5-3x}$ by expressing both sides of the equation as powers of 4.

b) Solve $16^{3x+2} = 64^{5-3x}$ by expressing both sides of the equation as powers of 2.

c) Solve $16^{3x+2} = 64^{5-3x}$ by using graphing technology.

d) Which of the methods is "best"? Explain.

8. **a)** Using your knowledge of the base graphs and transformations, sketch graphs of $y = 3^{2x}$ and $y = (x-3)^2$ on the same axes.

b) Use your graphs to estimate the solution to $3^{2x} \le (x-3)^2$.

c) **Use Technology** Solve $3^{2x} \le (x-3)^2$, correct to two decimal places, by using graphing technology.

9. Consider the functions $f(x) = 4x$, $g(x) = x^4$, and $h(x) = 4^x$.

a) Estimate the instantaneous rate of change for the three functions when $x = 1$.

b) Repeat part a) for $x = 10$.

c) Discuss which type of function—linear, polynomial, or exponential—has the greatest rate of change.