Name _____ Date _____

Practice 5.1: Exponential Functions

1. Use the properties of exponents to simplify the expressions.

a. $5^{3x}(5^{-x})$ **b.** $\dfrac{4^{5x}}{4^{2x}}$ **c.** $(4^{2x})^3$

d. $(2^{3x})^{-1/3}$ **e.** $\left(\dfrac{4^x}{3^x}\right)^{-1}$ **f.** $(16^x)^{-1/4}$

2. Use a calculator to evaluate the expressions. Include three decimal places.

a. $(3.4)^{5.6}$ **b.** $5000(2^{-1.5})$ **c.** $1000(1.06)^{-5}$

d. $(1.005)^{400}$ **e.** $5^{-\pi}$ **f.** $\sqrt[4]{83521}$

g. $100^{\sqrt{2}}$ **h.** $e^{-3/4}$ **i.** $e^{3.2}$

3. Match the exponential equations with their graphs.

1. $f(x) = 3^x$

2. $f(x) = 3^{-x}$

3. $f(x) = -3^x$

4. $f(x) = -3^{-x}$

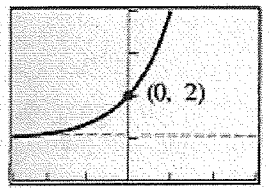
5. $f(x) = 3^x - 4$

6. $f(x) = 3^x + 1$

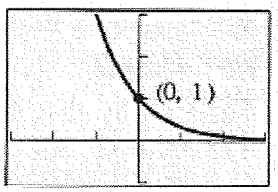
7. $f(x) = -3^{x-2}$

8. $f(x) = 3^{x-2}$

(a)



(b)



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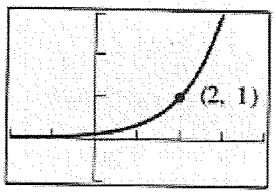
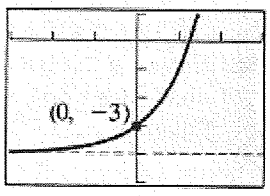


(d)



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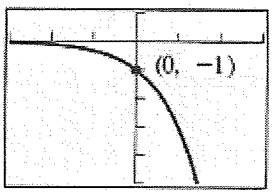
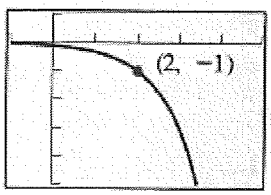
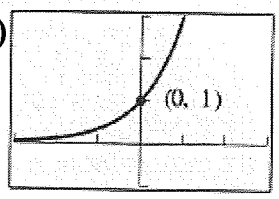


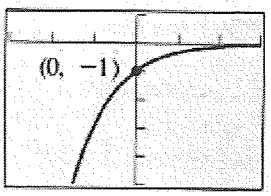
(f)



(g)



(h)



4. Use a graphing calculator to answer the following questions.

a) Graph 4^x and 3^x on the same window. Find when $4^x < 3^x$.

b) Graph $\left(\frac{1}{4}\right)^x$ and $\left(\frac{1}{2}\right)^x$ on the same window. Find when $\left(\frac{1}{4}\right)^x \geq \left(\frac{1}{2}\right)^x$.

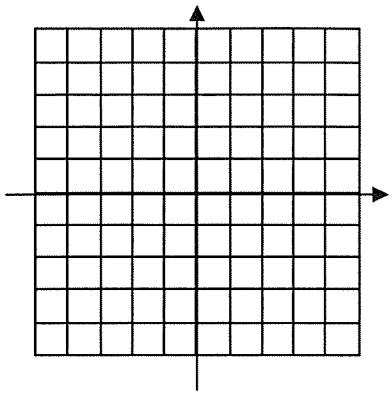
5. Sketch and label the following graphs on the axes below.

a) $f(x) = 2^x$

b) $f(x) = 2^{-x}$

c) $f(x) = 2^{x-3}$

d). $f(x) = 2^{-x} + 1$



6. A certain kind of bacteria increases according to the formula:

$P(t) = 100e^{0.2197t}$ where t is time in minutes

Find:

a) $P(0)$

b) $P(5)$

c) $P(10)$

d) $P(20)$