

### Math 3 Review Day 5- Inverses, Logarithms and Exponentials

1. Find the inverse of each.

a.  $f(x) = -3(x-2)^4 + 8$

$$f^{-1}(x) = \sqrt[4]{\frac{x-8}{-3}} + 2$$

b.  $g(x) = \frac{2\sqrt{3x-2}}{-4}$

$$g^{-1}(x) = \left(\frac{-4x}{2}\right)^2 + 2$$

$$g^{-1}(x) = \frac{4x^2 + 2}{3}$$

2. Solve.

a.  $2^{x-4} = 4^8$

$$2^{x-4} = 2^{16}$$

$$x-4 = 16$$

$$x = 20$$

b.  $5^{3x+9} = 8$

$$(3x+9)\log 5 = \log 8$$

$$3x+9 = \frac{\log 8}{\log 5}$$

$$x \approx 2.57$$

c.  $h(x) = 3^x - 8$

$$x = 3^y - 8$$

$$x+8 = 3^y$$

$$\log(x+8) = y \log 3$$

$$\frac{\log(x+8)}{\log 3} = h^{-1}(x)$$

d.  $k(x) = 2\log_4 x - 3$

$$x = 2\log_4 y - 3$$

$$\frac{x+3}{2} = \log_4 y$$

$$4^{\frac{x+3}{2}} = k^{-1}(x)$$

e.  $12^{5-3x} = 4^{2x-7}$

$$(5-3x)\log 12 = (2x-7)\log 4$$

$$5\log 12 - 3x\log 12 = 2x\log 4 - 7\log 4$$

$$5\log 12 + 7\log 4 = x(2\log 4 + 3\log 12)$$

$$2\log 4 + 3\log 12$$

$$x \approx 2.16$$

3. Precious puts \$500 in a bank account that earns 2.6% interest.

a. If the interest was compounded monthly, how much would be in her account after 20 years if she does not add any money to the account?

$$A = 500\left(1 + \frac{.026}{12}\right)^{12(20)}$$

$$A = \$840.54$$

b. If the interest was compounded quarterly, how much would be in her account after 20 years if she does not add any money to the account?

$$A = 500\left(1 + \frac{.026}{4}\right)^{4(20)}$$

$$A = \$839.60$$

4. There is a collection of 200 bacteria in the school bathroom that is growing at a rate of 1.5% per day. How many bacteria will be in the bathroom at the end of 2 weeks?

$$P = 200e^{.015(14)}$$

$$P = 246.74 \text{ bacteria}$$