

## Learning Targets – 7.5 Exponential and Logarithmic Equations

- a.) I can solve exponential equations (common and uncommon bases).
- b.) I can solve logarithmic equations using exponent and logarithmic properties.

Solve each equation. If necessary, round to 4 decimal places.

1.)  $\log_5(x-2) + \log_5 2 = 2$

$$\log_5 2(x-2) = 2$$

$$5^2 = 2(x-2)$$

$$25 = 2x - 4$$

$$29 = 2x$$

$$x = 29/2$$

2.)  $\log_2 x - \log_2 2 = 5$

$$\log_2 \frac{x}{2} = 5$$

$$2^5 = \frac{x}{2}$$

$$32 = \frac{x}{2}$$

$$x = 64$$

3.)  $\ln(2x-3) - \ln 4 = \ln 5$

$$\ln \frac{2x-3}{4} = \ln 5$$

$$\frac{2x-3}{4} = \frac{5}{1}$$

$$2x-3 = 20$$

$$2x = 23$$

$$x = 23/2$$

4.)  $\log_3(x-6) + \log_3(x) = 3$

$$\log_3 x(x-6) = 3$$

$$3^3 = x(x-6)$$

$$27 = x^2 - 6x$$

$$0 = x^2 - 6x - 27$$

$$0 = (x-9)(x+3)$$

$$x = 9 \quad x = -3$$

EXTRANELOUS

5.)  $2 \log_4(x+2) = 3$

$$\log_4 (x+2)^2 = 3$$

$$4^3 = (x+2)^2$$

$$64 = x^2 + 4x + 4$$

$$0 = x^2 + 4x - 60$$

$$0 = (x+10)(x-6)$$

$$x = -10 \quad x = 6$$

EXTRANELOUS

6.)  $\log_3(3x+4) - \log_3 2 = \log_3(3x-1)$

$$\log_3 \frac{3x+4}{2} = \log_3 3x-1$$

$$\frac{3x+4}{2} = \frac{3x-1}{1}$$

$$2(3x-1) = 3x+4$$

$$6x-2 = 3x+4$$

$$3x-2 = 4$$

$$3x = 6$$

$$x = 2$$