

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.

Scenario 2: Uncommon Bases

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

1.) $3^x = 4$

$$\log_3 4 = x$$

2.) $4^x = 15$

$$\log_4 15 = x$$

3.) $20 = 5^x$

$$\log_5 20 = x$$

4.) $2^{3x-2} = 10$

$$\log_2 10 = 3x - 2$$

$$\log_2 10 + 2 = 3x$$

$$x = \frac{\log_2 10 + 2}{3}$$

5.) $e^{2x+1} = 3$

$$\ln 3 = 2x + 1$$

$$\ln 3 - 1 = 2x$$

$$x = \frac{\ln 3 - 1}{2}$$

6.) $25 = e^{3x+2}$

$$\ln 25 = 3x + 2$$

$$\ln 25 - 2 = 3x$$

$$x = \frac{\ln 25 - 2}{3}$$

7.) $\log_3 x = 2$

$$3^2 = x$$

$$9 = x$$

8.) $\log_4(2x - 1) = 3$

$$4^3 = 2x - 1$$

$$64 = 2x - 1$$

$$65 = 2x$$

$$x = \frac{65}{2}$$

9.) $\ln(x + 4) = 5$

$$e^5 = x + 4$$

$$x = e^5 - 4$$

10.) $\ln(2x + 3) = 2$

$$e^2 = 2x + 3$$

$$e^2 - 3 = 2x$$

$$x = \frac{e^2 - 3}{2}$$

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.) $4^{x-1} = 23$

$$\log_4 23 = x - 1$$

$$x = \log_4 23 + 1$$

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

$$3^4 = 2x - 1$$

$$81 = 2x - 1$$

$$82 = 2x$$

$$x = 41$$

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

$$e^5 = x + 2$$

$$x = e^5 - 2$$

4.) $5^{2x+1} = 15$

$$\log_5 15 = 2x + 1$$

$$\log_5 15 - 1 = 2x$$

$$x = \frac{\log_5 15 - 1}{2}$$

5.) $e^{2x+1} = 5$

$$\ln 5 = 2x + 1$$

$$\ln 5 - 1 = 2x$$

$$x = \frac{\ln 5 - 1}{2}$$

6.) $\log_5(4x - 3) = 2$

$$5^2 = 4x - 3$$

$$25 = 4x - 3$$

$$28 = 4x$$

$$x = 7$$

7.) $\ln(2x + 3) = 2$

$$e^2 = 2x + 3$$

$$e^2 - 3 = 2x$$

$$x = \frac{e^2 - 3}{2}$$

8.) $8 = e^{x+5}$

$$\ln 8 = x + 5$$

$$\ln 8 - 5 = x$$