

Day 2

# Chapter 3

## Learning Target 3

I can solve exponential and logarithmic equations.

$$1.) \quad 2^{2x} = 8^{2x-4}$$

$$\cancel{2^{2x}} = \cancel{2^{3(2x-4)}}$$

Change bases to  
be the same.

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

$$2x = 6x - 12$$

$$0 = 4x - 12$$

$$12 = 4x$$

$$\rightarrow \boxed{x=3}$$

$$2.) \left(\frac{1}{4}\right)^x = 64^{-3x+5}$$

Log both sides

$$\log \frac{1}{4} = \log 64^{-3x+5}$$

$$x \log \frac{1}{4} = (-3x+5) \log 64$$

$$\frac{\log \frac{1}{4}}{\log \frac{1}{4}} = \frac{(-3x+5) \log 64}{\log \frac{1}{4}}$$

$$x = (-3x+5)(-3)$$

$$x = 9x - 15$$

$$0 = 8x - 15$$

$$15 = 8x$$

$$x = \frac{15}{8}$$

$$3.) 3^{-19x-20} = 27^{x^2}$$

$$\log 3^{-19x-20} = \log 27^{x^2}$$

$$(-19x-20) \log 3 = (x^2) \log 27$$

$$-19x-20 = (x^2)(3)$$

$$-19x-20 = 3x^2$$

$$0 = 3x^2 + 19x + 20$$

$$0 = (3x+4)(x+5)$$

$$x = -5, -\frac{4}{3}$$

$$\begin{array}{l} -19x-20 \quad 3(x^2) \\ 3 = 3 \end{array}$$

$$-19x-20 = 3x^2$$