**Lesson 5.9 Exponential Equations**

***Goal: Use equality of powers with a common base to solve exponential equations***

An exponential equation is an equation that contains a variable in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Some exponential equations can be solved ***WITHOUT TECHNOLOGY*** by writing both sides of the equation as powers of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

***Equality of Powers with a Common Base \*\*Called Equating the Powers\*\****

***EXAMPLE 1*** Since  and  are both powers of 4, the exponents must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,
so the solution to  is \_\_\_\_

***EXAMPLE 2 Finding a Common Base***

 Solve each of the following.

**a)**  **b)**  **c)** 

**d)**  **e)** 

**g)** 

**h)** 

***EXAMPLE 3*** A cross country skier forgets a mug of coffee and a muffin in a snow bank. Their temperatures, in degrees Celsius, after t minutes can be modelled by the formulas:

  and . Determine when the coffee cools to the same temperature as the muffin.

**Practice**: Page 384 #1 – 3 (cd), 4, 5, 6, 7aceg, 10abd, 15, 16ab