**PreCalculus 3.3 Properties of Logarithms**

**Change of Base Formula**

 (some calculators have a change of base key)

Examples:

**Properties of Logarithms**

 Product property

 Quotient property

 Power property

Example: Find the exact value of each expression without using a calculator.

Example: Expand each logarithmic expression

Example: Condense each logarithmic expression

**Application**

 Sound Intensity: = sound intensity (decibels)

 *I* = intensity of the sound

 Find the loudness of a noise with an intensity: