**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: