Precalculus 5.2 Key Points

Logarithms:
Logarithms (often shortened to "logs") are similar to exponents.
If $log_a(b) = c$, then $a^c = b$
For the logarithm above: a is the <u>base</u>, b is the <u>argument</u>, c is the <u>result</u>
For example, if $2^3 = 8$, then $If\ log_2(8) = 3$. This is saying that, to raise 2 to the power of some number to get 8, it needs to be raised to the power of 3.
If a logarithm is written without a base, such as $log(5)$, then it can be assumed that the base is 10. So, $log(5) = log_{10}(5)$
If a logarithm has a base of e, then it can be written as ln, which is called the "natural log." So, $ln(8) = log_e(8)$

Logarithm Properties:

<u>Property</u>	<u>Example</u>
Inverse Property $log_b(b) = 1$	$log_2(2) = 1$
Addition/Product Property $log_b(xy) = log_b(x) + log_b(y)$	$log_4(11 \bullet y) = log_4(11) + log_4(y)$
Subtraction/Quotient Property $log_b(\frac{x}{y}) = log_b(x) - log_b(y)$	$log_4(\frac{x}{14}) = log_4(x) - log_4(14)$
Power Property $log_b(x^n) = n \bullet log_b(x)$	$log_5(x^8) = 8 \bullet log_5(x)$
Change of Base Formula $log_b(a) = \frac{log_c(a)}{log_c(b)}$	$log_{17}(23) = \frac{log_{10}(23)}{log_{10}(17)}$ (This is especially useful if your calculator only has base-10 logs)