Questions from Homework

⑤ c) $5^{\log_5 25}$

5^{a}

25

Ex: $7^{\log_7 50}$

$= 50$

③ e) $\log_2\left(\frac{1}{32}\right) = -5$

$2^y = \frac{1}{32}$

$2^y = 2^{-5}$

$y = -5$

d) $\log_{10}\left(\frac{1}{1000}\right) = -3$

$10^y = \frac{1}{1000}$

$10^y = 10^{-3}$

$y = -3$

j) $\log_m m^x = x$

$m^y = m^x$

$y = x$

b) $\log_e 1$

$e^y = 1$

$e^y = e^0$

$y = 0$

Logarithms

exponential form

$$x = b^y$$

Say "the base ***b*** to the exponent ***y*** is ***x***."

logarithmic form

$$y = \log_b x$$

Say "***y*** is the exponent to which you raise base ***b*** to get the answer ***x***."

Skills with logarithms are needed to solve equations involving logarithms. When solving these equations, you must remember the meanings of the exponential form and the logarithmic form.

$$x = b^y \longleftrightarrow y = \log_b x$$

Example 1

$\log_3 m = 4$

$m = 3^4$

$m = 81$

$$x = b^y \longleftrightarrow y = \log_b x$$

Example 2

$$\log_8 4 = y$$

$8^y = 4$

$(2^3)^y = 2^2$

$2^{3y} = 2^2$

$3y = 2$

$y = \frac{2}{3}$

$$x = b^y \longleftrightarrow y = \log_b x$$

Example 3

a) $\log_x 49 = 2$

$(x^{2})^{1/2} = (49)^{1/2}$

$x = 7$

b) $\log_x 4 = \frac{2}{3}$

$(x^{2/3})^{3/2} = (4)^{3/2}$

$x = \sqrt{4^3}$

$x = \sqrt{64}$

$x = 8$

c) $\log_x 81 = 4$

$(x^{4})^{1/4} = (81)^{1/4}$

$x = \sqrt[4]{81}$

$x = 3$

When solving some logarithmic equations, or simplifying logarithmic expressions, you will use the following property.

$$b^{\log_b m} = m$$

Example 4

a) $2^{\log_2 4} = 4$

b) $7^{\log_7 2401} = 2401$

Homework

④ i $\log_2 8\sqrt{2} = x$

$2^x = 8\sqrt{2}$

$2^x = (2^3)(2^{1/2})$

$2^x = 2^{7/2}$

$x = 7/2$