5.4.13, 21, 29

Exercise 5.4.13 Change the exponential statement $a^2 = 1.6$ into an equivalent logarithmic statement.

Solution

By the definition of logarithm, we have $y = \log_a(x)$ if and only if $x = a^y$. So in $1.6 = a^2$ we have $x = 1.6$ and $y = 2$. So the logarithmic statement is $\boxed{2 = \log_a(1.6).}$

Exercise 5.4.21 Change the logarithmic statement $\log_a(3) = 6$ into an equivalent exponential statement.

Solution

By the definition of logarithm, we have $y = \log_a(x)$ if and only if $x = a^y$. So in $\log_a(3) = 6$ we have $x = 3$ and $y = 6$. So the exponential statement is $\boxed{3 = a^6}$.

Exercise 5.4.29 Find the exact value of $\log_7(49)$ without using a calculator.

Solution

Let $y = \log_7(49)$. By the definition of logarithm, we have $y = \log_a(x)$ if and only if $x = a^y$. So $y = \log_7(49)$ is equivalent to $7^y = 49$. Since $7^2 = 49$, then

$\boxed{y = \log_7(49) = 2.}$ □