72. (a) $f(x) = \ln(\ln(\ln x))$. We must have $\ln(\ln x) > 0 \quad \Leftrightarrow \quad \ln x > 1 \quad \Leftrightarrow \quad x > e$. So the domain of f is (e, ∞).

(b) $y = \ln(\ln(\ln x)) \quad \Leftrightarrow \quad e^y = \ln(\ln x) \quad \Leftrightarrow \quad e^{e^y} = \ln x \quad \Leftrightarrow \quad e^{e^{e^y}} = x$. Thus the inverse function is $f^{-1}(x) = e^{e^{e^x}}$.

74. (a) Since 2 feet = 24 inches, the height of the graph is $2^{24} = 1677216$ inches. Now, since there are 12 inches per foot and 5280 feet per mile, there are $12(5280) = 63360$ inches per mile. So the height of the graph is $\frac{1677216}{63360} \approx 264.8$, or about 265 miles.

(b) Since $\log_2(2^{24}) = 24$, we must be about 2^{24} inches $\approx$ 265 miles to the right of the origin before the height of the graph of $y = \log_2 x$ reaches 24 inches or 2 feet.

76. Notice that $\log_a x$ is increasing for $a > 1$. So we have $\log_4 17 > \log_4 16 = \log_4 4^2 = 2$. Also, we have $\log_5 24 < \log_5 25 = \log_5 5^2 = 2$. Thus, $\log_5 24 < 2 < \log_4 17$.