Math 112
Quiz #5

Compute the following limit:

$$\lim_{z\to\infty} \ln(z)^{A/z},$$

where $A > 0$ is a constant.

Let $y = \ln(z)^{A/z}$. Then,

$$\ln(y) = \frac{A}{z} \cdot \ln(\ln(z))$$

$$\Rightarrow \lim_{z\to\infty} \ln(y) = \lim_{z\to\infty} A \cdot \frac{\ln(\ln(z))}{z}$$

$$= \lim_{z\to\infty} A \cdot \frac{1}{z\ln(z)} = 0.$$

Therefore,

$$\ln\left(\lim_{z\to\infty} y\right) = 0$$

$$\Rightarrow \lim_{z\to\infty} y = e^0 = 1.$$