

1. Find the error in the following “proof” that $\frac{1}{8} > \frac{1}{4}$.

Start with the fact that $3 > 2$.

Multiply both sides of the inequality by $\log \frac{1}{2}$ to get:

$$3 \log \frac{1}{2} > 2 \log \frac{1}{2}$$

Using a property of logarithms:

$$\log \left(\frac{1}{2} \right)^3 > \log \left(\frac{1}{2} \right)^2$$

$$\log \frac{1}{8} > \log \frac{1}{4}$$

$$10^{\log \frac{1}{8}} > 10^{\log \frac{1}{4}}$$

$$\frac{1}{8} > \frac{1}{4}$$

2. Graph $y = \ln x^2$ and $y = 2 \ln x$. Explain why the graphs are different.

Repeat the problem for the graphs of $y = x$ and $y = e^{\ln x}$.

3. Solve for y : $\ln(\sqrt[3]{4y+3}) = \pi$