

1. Explain the relationship between the functions e^x and $\ln x$. Why is the base “ e ” so important in calculus?
2. Recall that \sin and \arcsin are inverse functions. Consider the following two statements: $\sin(\arcsin(x)) = x$ and $\arcsin(\sin(x)) = x$. One of these statements is *always* true, and one is *sometimes* true. Explain why. For the one which is sometimes true, for which values of x is it true?
3. Evaluate the limit $\lim_{x \rightarrow \infty} \frac{3^x}{2^x}$. Explain the difficulty encountered when applying L'Hôpital's Rule.