

Due: Aug 27th

1. Do Exercise S-3.51 (c), that is, Evaluate the limit $\lim_{x \rightarrow 2} \frac{x^2 - 4}{x - 2}$, first by using the definition and then by using theorems on limits.
2. Do Exercise S-3.55, that is, Prove that $\lim_{x \rightarrow 3} 10^{-1/(x-3)^2} = 0$ using the definition.
3. Do Exercise S-3.59 (b), that is, Explain *exactly* what is meant by

$$\lim_{x \rightarrow 0^+} (1 - e^{1/x}) = -\infty.$$

4. Let $f(x, y) = x^{-1} \sin(xy)$ for $x \neq 0$. How should you define $f(0, y)$, $y \in \mathbb{R}$, to make f continuous on all of \mathbb{R}^2 ?

EXTRA CREDIT: Prove that your answer does make f continuous on all of \mathbb{R} . You may assume that $\lim_{z \rightarrow 0} \sin(z)/z = 1$.