

Math 114 Fall 2017
Calculus I HW 5 Solutions
Due **Friday**, October 13

1. Stewart 1.4.34
2. Stewart 1.4.36
3. (★) Using the squeeze theorem, show that

$$\lim_{x \rightarrow -2} \frac{x+2}{2 + \sin\left(\frac{1}{x+2}\right)} = 0.$$

Solution: We observe that

$$\begin{aligned} -1 &\leq \sin\left(\frac{1}{x+2}\right) \leq 1 \\ 1 &\leq 2 + \sin\left(\frac{1}{x+2}\right) \leq 3 \\ 1 &\geq \frac{1}{2 + \sin\left(\frac{1}{x+2}\right)} \geq \frac{1}{3} \geq -1 \\ |x+2| &\geq \frac{x+2}{2 + \sin\left(\frac{1}{x+2}\right)} \geq -|x+2| \end{aligned}$$

Then we compute $\lim_{x \rightarrow -2} |x+2| = 0$ and $\lim_{x \rightarrow -2} -|x+2| = 0$, so by the Squeeze Theorem,

$$\lim_{x \rightarrow -2} \frac{x+2}{2 + \sin\left(\frac{1}{x+2}\right)} = 0.$$

4. Stewart 1.4.50
5. Stewart 1.4.52 (Hint: what trig identities do we know? Can we make one of them show up?)
6. Stewart 1.4.54
7. Stewart 1.5.4
8. (★) Stewart 1.5.6