

Math 114 Spring 2019
Calculus I HW 2 Solutions
Due Wednesday, February 6

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

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

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

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

Thus

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

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 1.6.16
8. Stewart 1.6.18
9. Stewart 1.6.20
10. Stewart 1.6.22
11. Stewart 1.6.24
12. (★) Stewart 1.6.28