

Math 114 Fall 2018
Calculus I HW 5 Solutions
Due *Friday* October 12

Make sure you have Stewart essential calculus early transcendentals second edition!

1. Stewart 1.4.50
2. Stewart 1.4.52 (Hint: what trig identities do we know? Can we make one of them show up?)
3. Stewart 1.4.54
4. (★) Stewart 1.5.6
5. (★) Stewart 1.5.8
6. Stewart 1.5.16
7. Let

$$f(x) = \begin{cases} x + 3 & x > 2 \\ x^2 + 1 & x < 2 \end{cases}$$

Define a function that extends f and is continuous at all real numbers.

Solution: Define

$$f_F(x) = \begin{cases} x + 3 & x > 2 \\ x^2 + 1 & x < 2 \\ 5 & x = 2 \end{cases}$$

Then f_F is continuous at 2 since $\lim_{x \rightarrow 2^-} f_F(x) = \lim_{x \rightarrow 2^-} x^2 + 1 = 5$ and $\lim_{x \rightarrow 2^+} f_F(x) = \lim_{x \rightarrow 2^+} x + 3 = 5$.

8. Let

$$g(x) = \begin{cases} x^2 - 5 & x > -1 \\ 4x & x < -1 \end{cases}$$

Define a function that extends g and is continuous at all real numbers.

Solution: Define

$$g_F(x) = \begin{cases} x^2 - 5 & x > -1 \\ 4x & x < -1 \\ -4 & x = -1 \end{cases}$$

Then g_F is continuous at -1 since $\lim_{x \rightarrow -1^-} g_F(x) = \lim_{x \rightarrow -1} 4x = -4$ and $\lim_{x \rightarrow -1^+} g_F(x) = \lim_{x \rightarrow -1} x^2 - 5 = -4$.

9. Stewart 1.5.30
10. (★) Stewart 1.5.36
11. Stewart 1.5.40
12. Stewart 1.5.42