

Math 114 Spring 2017
Calculus I HW 6 Solutions
Due Friday, March 17

1. Stewart 1.5.16

2. 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 $\lim_{x \rightarrow 2^+} f_F(x) = \lim_{x \rightarrow 2^+} x + 3 = 5$.

3. 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 $\lim_{x \rightarrow -1^+} g_F(x) = \lim_{x \rightarrow -1^+} x^2 - 5 = -4$.

4. Stewart 1.5.30

5. Stewart 1.5.34

6. Stewart 1.5.36 (N in this problem is the target output, what I called y in class)

7. Stewart 1.5.38

8. Stewart 1.5.40

9. Stewart 1.5.42
10. Stewart 2.1.4
11. Stewart 2.1.12