

3.11.5

Find the linearization of  $f(x) = \tan(x)$   
at  $a = \pi$ .

Solution

Well, the linearization is

$$L(x) = f(a) + f'(a)(x-a).$$

Here,  $f(x) = \tan(x)$  so

$$f(a) = \tan(\pi) = 0, \text{ and}$$

$$f'(x) = \sec^2(x). \text{ so}$$

$$f'(a) = \sec^2(\pi) = \frac{1}{\cos^2(\pi)} = \frac{1}{(-1)^2} = 1.$$

$$\text{Hence, } L(x) = (0) + (1)(x - (\pi)) = \boxed{x - \pi}. \quad \square$$