

3.5.9 Differentiate $y = f(x) = x e^{-x} \sec(x)$.

Solution

Well, we have $f(x) = (x e^{-x}) \sec(x)$.

Then, by the Derivative Product Rule (Theorem 3.3.6) we have

$$f'(x) = \left[[1] (e^{-x}) + (x) [e^{-x} \overset{\curvearrowright}{[-1]}] \right] \sec(x) + (x e^{-x}) [\sec(x) \tan(x)]$$

$$= [1] (e^{-x}) (\sec x) + (x) [-e^{-x}] (\sec(x)) + (x e^{-x}) [\sec(x) \tan(x)]$$

(notice the pattern in the square brackets; see the Class Notes for Section 3.3 and Exercise 3.3, 77). \square