

(1) [2 points] Differentiate

$$F(y) = \left(\frac{1}{y^2} - \frac{3}{y^4} \right) (y + 5y^3)$$

(2) [3 points] Differentiate

$$f(\theta) = \frac{\sec(\theta)}{1 + \sec(\theta)}$$

(3) [2 points] Differentiate

$$y = (1 - x^2)^{10}$$

(4) [3 points] Differentiate

$$y = \frac{r}{\sqrt{r^2 + 1}}$$

(5) [5 points] Differentiate

$$y = \cot^2(\sin \theta)$$