

(1) [3 points] Differentiate $y = \frac{r^2}{1 + \sqrt{r}}$.

(2) [3 points] Differentiate $g(t) = t^5 \sin(t)$.

(3) [3 points] Differentiate $y = (5x - 2)^5(5x^2 - 8)^{-4}$.

(4) [3 points] Differentiate $y = \cot^2(\tan(\theta))$.

(5) [3 points] Use implicit differentiation to determine y' if $x^2y + xy^2 = 3x$.