

Differentiate each of the following by hand.

1.  $f(x) = e^x (x^2 + 2x)$

2.  $y = \frac{e^x}{1 - e^x}$

3.  $g(z) = (1 - e^z)(z + e^z)$

4.  $f(t) = \frac{1 - te^t}{t + e^t}$

5.  $y = \frac{(x^2 - 2)(x^3 - 1)}{\sqrt{x}(x + 1)}$

6.  $f(s) = \frac{1 - s^2 + s^3}{s^{40}}$

7.  $f(u) = u^{3/2}(u + xe^u)$