2.7 Differential Techniques: The product and Quotient Rule:

**Product Rule:**

Let, \( f(x) = x \cos x \). Find \( f'(x) \).

**Quotient Rule:**

\[
f(x) = \frac{x^2 - 3x}{x - 1}
\]

2.8 Chain Rule

(a) \( f(x) = (1 + x^3)^{\frac{1}{2}} \)

2.9 Higher-Order Derivatives

For \( y = \frac{1}{x} \), find \( \frac{d^2y}{dx^2} \)

3.0 Using Derivatives to Find Absolute Maximum and Minimum Values

**Exercise: Lung Cancer:** The rate of lung and bronchus cancer per 100,000 American males since 1930 is approximated by the function

\[
r(x) = -0.000775x^3 + 0.0696x^2 - 0.209x + 4.68,
\]

where \( x \) is the number of years since 1930. Sketch the graph of \( r(x) \).

**Exercise:**

Find the absolute maximum and minimum values of \( f(x) = x^3 - 3x + 2 \) over the interval \([\frac{3}{2}, 3]\).