

MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 3.7

Math 1000 Worksheet

FALL 2024

For practice only. Not to be submitted.

1. Find the third derivative of $f(x) = x^2e^x$.
2. Find the fourth derivative of $f(x) = x \sin(x)$.
3. Find the second derivative of $y = \tan(x^2)$.
4. Find $\frac{d^2y}{dx^2}$ given $y = x^2 + \sin(y)$.
5. Show that if $\sqrt{x} + \sqrt{y} = 2$ then $\frac{d^2y}{dx^2} = x^{-\frac{3}{2}}$.
6. A puppy runs in a straight line such that its position can be described by

$$s(t) = \frac{49t - 10}{t + 10} - 3.9,$$

where t is measured in seconds and $s(t)$ is measured in centimetres. What is the puppy's initial velocity and acceleration?