

MA 341 – Review Assignment 1

Question 1

If f is a differentiable function, find an expression for the derivative of each of the following functions.

(a) $y = x^2 f(x)$

(b) $y = \frac{f(x)}{x^2}$

(c) $y = \frac{x^2}{f(x)}$

(d) $y = \frac{1 + xf(x)}{\sqrt{x}}$

Question 2

On what interval is the function $f(x) = x^2 e^x$ concave downward?

Question 3

Find the derivative of the following function.

$$y = e^{-7x} \cos 3x$$

Question 4

Find the derivative of the following function.

$$y = \tan^2 6x$$

Question 5

Find $\frac{dy}{dx}$ by implicit differentiation.

$$y^5 + x^2 y^3 = 1 + ye^{x^2}$$

Question 6

Differentiate the following function.

$$h(x) = \ln(x + \sqrt{x^2 - 1})$$

Question 7

Find the linearization $L(x)$ of the following function at $a = -8$.

$$f(x) = \sqrt[3]{x}$$

Question 8

Evaluate the following indefinite integral.

$$\int x^3 (1 - x^4)^9 dx$$

Question 9

Evaluate the following integral using integration by parts with $y = \theta$ and $dv = \cos \theta d\theta$.

$$\int \theta \cos \theta d\theta$$

Question 10

Write out the form of the partial fraction expansion in each function. Do not determine the numerical values of the coefficients.

(a) $\frac{x-1}{x^3 + x^2}$

(b) $\frac{x-1}{x^3 + x}$