ANSWER ALL QUESTIONS

QUESTION 1: (07 MARKS)

(a) Using the Taylor Series show that

\[ \sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \cdots \]

(b) Hence find the Taylor Series of \( \cos x \)

QUESTION 2: (07 MARKS)

(a) Find the inverse of

\[ X = \begin{bmatrix} 2 & 4 \\ 5 & -1 \end{bmatrix} \]

(b) Hence solve the simultaneous equations

\[ \begin{align*}
2x + 4y &= 1 \\
5x - y &= 8
\end{align*} \]

QUESTION 3: (08 MARKS)

(a) Given \( f(x) = x^3 \sqrt{1-x^2} \), find \( f'(x) \).

(b) Evaluate

\[ \int \frac{\ln x}{x} \, dx \]