

Course: Calculus and analytical geometry

Program: BS (SE, CS)

Instructor: Muhammad Abrar Khan

Examination: Final Paper

Total Marks: 80

Date: September. 24, 2020

Note: Attempt all questions. Use examples and diagrams where necessary.

Q.1

- a) Differentiate $\frac{3x^4-2x^3+5}{x^3+1}$ with respect to x.
b) Differentiate $\frac{(x^3+1)^2}{x^3-1}$ with respect to x.

Q.2

- b) Find $\frac{dy}{dx}$ if $y = (1+2\sqrt{x})^3 \cdot x^{2/3}$ using chain rule.
a) Find $\frac{dy}{dx}$ if $y = \sqrt{\frac{1-x}{1+x}}$ using chain rule.

Q.3

- a) Find the Integration of $\int \frac{1}{\sqrt{x^5}} dx$.
b) Find the Integration of $\int \frac{1}{(8x+7)^8} dx$.

Q.4

- a) Find the Integration of $\int \frac{-x+9}{2x^2-8x+6} dx$ by Partial fractions.
b) Find the Integration of $\int \frac{4x^2+8x}{(x^2+1)(x^2+2x+3)} dx$ by Partial fractions.

Q.5

Solve each of the following matrix equations:

- a) $X + \begin{bmatrix} 3 & -1 \\ 2 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 1 \\ -3 & 1 \end{bmatrix}$
b) $X + \begin{bmatrix} -1 & 0 \\ 0 & 2 \end{bmatrix} = \begin{bmatrix} 2 & 6 \\ 1 & 5 \end{bmatrix} + \begin{bmatrix} -4 & -8 \\ -2 & 0 \end{bmatrix}$
c) $X + 2I = \begin{bmatrix} 3 & -1 \\ 1 & 2 \end{bmatrix}$

Q.6

- a) If $A = \begin{bmatrix} 1 & 4 \\ 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}$, $C = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ Find A^2+BC

