



Q.1. Solve the following:

(6x5=30)

(i)	Let $f(x) = x^3 + 4x$ Find equation of secant line through the points $(-2, f(-2))$ and $(1, f(1))$.	(5)
(ii)	Sketch the graph of parabola, specify the focus, the directrix and the focal width $3x^2 + 6x + 2y + 13 = 0$	(5)
(iii)	Evaluate $\lim_{x \rightarrow 0} \frac{1}{1 - \cos x}$	(5)
(iv)	Evaluate $\int x^5 \sqrt{x^3 + 16} dx$.	(5)
(v)	Solve the inequality $\left \frac{3(5x+2)}{2} + \frac{6(2x-1)}{3} \right \leq 5$	(5)
(vi)	Solve the initial value problem $\frac{dy}{dx} = -4xy^2, \quad y(0) = 1$	(5)

Solve the following:

(5x6=30)

Q.2	Let A denote the area between the graph $f(x) = \sqrt{x}$ and interval $[0,1]$ also B denotes the area between the graph $f(x) = x^2$ and interval $[0,1]$. Explain geometrically why $A+B=1$?	(6)
Q.3	(a) Find general solution of the differential equation $8y'' - 2y' - y = 0$ (b) Find a second order linear homogeneous differential equation with constant coefficients from the following solutions $y_1 = e^{5x}, y_2 = e^{-2x}$	(2+4)
Q.4	Sketch the curve in polar coordinate $r = 6 \cos \theta$	(6)
Q.5	Verify that the hypothesis of Roll's theorem are satisfied on given interval and find all values of c in that interval $f(x) = x^2 - 6x + 8; \quad [2, 4]$	(6)
Q.6	Solve the following (a) $\lim_{x \rightarrow +\infty} \frac{x}{1+x}$ (b) $\lim_{x \rightarrow -\infty} (1 + \frac{2}{x})^x$	(2+4)