Date Planned : __ / __ / __	Daily Tutorial Sheet - 9	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	JEE Advanced (Archive)	Exact Duration :_____

81. If $\begin{bmatrix} 4a^2 & 4a & 1 \\ 4b^2 & 4b & 1 \\ 4c^2 & 4c & 1 \end{bmatrix} \begin{bmatrix} f(-1) \\ f(1) \\ f(2) \end{bmatrix} = \begin{bmatrix} 3a^2+3a \\ 3b^2+3b \\ 3c^2+3c \end{bmatrix}$, $f(x)$ is a quadratic function and its maximum value occurs at a point V. A is a point of intersection of $y = f(x)$ with x-axis and point B is such that chord AB subtends a right angle at V. Find the area enclosed by $f(x)$ and chord AB. **(2005)**

82. Find the area bounded by the curves $x^2 = y, x^2 = -y$ and $y^2 = 4x - 3$. **(2005)**

83. A curve passes through (2, 0) and the slope of tangents at point $P(x, y)$ equals $\frac{(x+1)^2 + y - 3}{(x+1)}$.

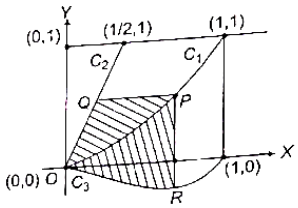
Find the equation of the curve and area enclosed by the curve and the X-axis in the fourth quadrant. **(2004)**

84. Find the area of the region bounded by the curves $y = x^2, y = |2 - x^2|$ and $y = 2$ which lies to the right of the line $x = 1$. **(2002)**

85. If $f(x)$ is a continuous function given by $f(x) = \begin{cases} 2x & , \ |x| \le 1 \\ x^2 + ax + b & , \ |x| > 1 \end{cases}$

Then, find the area of the region in the third quadrant bounded by the curves $x = -2y^2$ and $y = f(x)$ lying on the left on the line $8x + 1 = 0$. **(1999)**

86. Let C_1 and C_2 be the graphs of functions $y = x^2$ and $y = 2x, 0 \le x \le 1$, respectively. Let C_3 be the graph of a function $y = f(x), 0 \le x \le 1, f(0) = 0$. For a point P on C_1, let the lines through P, parallel to the axes, meet C_2 and C_3 at Q and R respectively (see figure). If for every position of P(on C_1) the areas of the shaded regions OPQ and ORP are equal, then determine $f(x)$. **(1998)**



87. Let $f(x) = \max\{x^2, (1-x)^2, 2x(1-x)\}$, where $0 \le x \le 1$. Determine the area of the region bounded by the curves $y = f(x), X - axis, x = 0$ and $x = 1$. **(1997)**

88. Find all the possible values of b > 0, so that the area of the bounded region enclosed between the parabolas $y = x - bx^2$ and $y = \frac{x^2}{b}$ is maximum. **(1997)**

89. If A_n is the area bounded by the curve $y = (\tan x)^n$ and the lines $x = 0, y = 0$ and $x = \frac{\pi}{4}$.

Then, prove that for $n > 2, A_n + A_{n+2} = \frac{1}{n+1}$ and deduce $\frac{1}{2n+2} < A_n < \frac{1}{2n-2}$. **(1996)**

90. In what ratio, does the X-axis divide the area of the region bounded by the parabolas $y = 4x - x^2$ and $y = x^2 - x$? **(1994)**