



Q.1. Solve the following:

(6x5=30)

1. Find the domain of the real valued function given by $f(x) = \frac{1}{\sqrt{(1-x)(2-x)}}$.
2. Solve the equation $|x| + |x - 1| = 0$ for $x < 0$.
3. Find the derivative of the function $5^{(\sin 3x)}$ with respect to x .
4. Evaluate the integral $\int x^2 e^x dx$.
5. Evaluate the definite integral $\int_{-1}^5 |x - 2| dx$.
6. Let the radius of the circle be increasing at the rate of 2 m/s. How fast is the area of that circle increasing when the radius of the circle is 40 m?

Q.2. Solve the following:

(3x10=30)

1. Examine whether the given function is continuous at $x = 0$,

$$f(x) = \begin{cases} (1 + 3x)^{\frac{1}{2}}, & x \neq 0; \\ e^2, & x = 0. \end{cases}$$

2. Find $\frac{dy}{dx}$ by implicit differentiation for the the curve $\tan^{-1} \left(\frac{y}{x} \right) + yx^2 = 1$.
3. Evaluate $\int \frac{1}{3 \sin x + 4 \cos x} dx$.