Q1   Find (a) limit: $\displaystyle\lim_{x\to 0} \frac{x+x\cos x}{six\cos x}$ (b) $\displaystyle\lim_{x\to 2} \frac{x^2-7x+10}{x-2}$

Q.2   (a) At what point(s) the function y= $\dfrac{x+1}{x^2-4x+3}$ is continuous?

(b) Using the chain rule, find $\dfrac{dy}{dx}$ where $y=\left(\dfrac{x}{2}-1\right)^{-10}$

Q.3   (a) Using quotient rule, find $\dfrac{dy}{dx}$ where $y=\dfrac{1-x}{1+x^2}$

(b) Using product rule, find $\dfrac{dy}{dx}$ where $y=\left(x+\dfrac{1}{x}\right)\left(x-\dfrac{1}{x}+1\right)$

Q.4   (a)Using derivative as a slope find line that are tangent and normal to the following curve at the given point. $x^2y^2=9, \quad (-1,\,3)$

(b) Evaluate the integral (i) $\displaystyle\int\left(3x^2+\dfrac{1}{2}\right)dx$ (ii) $\displaystyle\int\left(1-x^2-3x^5\right)dx$

Q.5   (a)Evaluate the integral (i) $\displaystyle\int_0^1\left(3x-\dfrac{x^3}{4}\right)dx$ (ii) $\displaystyle\int_0^{\pi}\sin x\,dx$

(b) Evaluate the integral $\displaystyle\int\dfrac{16x}{8x^2+2}\,dx$ by using substitution

Q.6   (a)Evaluate the following integral by using the given substitution $\displaystyle\int x^3\left(x^4-1\right)^2 dx, \ \ substitute\ u=x^4-1$

(b)Evaluate the integral $\displaystyle\int\dfrac{1}{(x-2)(x+2)}\,dx$ Using partial fraction

Q7.   (a) Evaluate the integral using by parts formula: $\displaystyle\int xe^x\,dx$

(b)Find the absolute maximum and minimum values of $f(x)=x^2-1$ $on\left[-1,2\right]$

Q8.   (a)Find the area of the region between the x-axis and the graph of $f(x)=-x^2-2x, where\ \ -2\le x\le 2$

(b) Find $\dfrac{dy}{dx}$, where $y=(\sin x+\cos x)\sec x$