

(1) Generate the membership table of the statement: $S = (A - B) \cup (B - C)$

(2) Evaluate the following limits:

(a) $\lim_{x \rightarrow 3} \frac{x^2 - 9}{\sqrt{x} - \sqrt{3}}$

(b) $\lim_{x \rightarrow \infty} \frac{2x^3 - 8x + 1}{3x^3 + 5x + 3}$

(c) $\lim_{x \rightarrow 3} \frac{\ln(x - 2)}{x - 3}$

(3) Find y' : (a) $y = x^3 + \sin x \cdot e^{3x}$ (b) $y = (x + \tan x)^5$

(4) Find y' from the equation: $y + \ln x + \sin(x + y) = 0$

(5) Determine the domain of the function $f(x) = x + 3 + \frac{4}{x - 3}$

(1) Generate the membership table of the statement: $S = (A \cup B) \cap (B \cap C)$

(2) Evaluate the following limits:

(a) $\lim_{x \rightarrow 1} \sqrt{\frac{\sqrt{x} - 1}{\sqrt[3]{x} - 1}}$

(b) $\lim_{x \rightarrow 0} \frac{3x^2 - 1}{3x}$

(c) $\lim_{x \rightarrow 0} \frac{\log(1 + 3x)}{4x}$

(3) Find y' : (a) $y = x^4 + 2^x \cdot \tan x$ (b) $y = 8 + \ln x \cdot \sin^{-1} x$

(4) Find y' from the equation: $2x + y^3 + \tan(x + 2y) = 0$

(5) Determine the domain of the function $f(x) = 3x + \sin x + \sqrt{x - 3}$

(1) Generate the membership table of the statement: $S = (A \cup B) \cup (B \cap C)$

(2) Evaluate the following limits:

(a) $\lim_{x \rightarrow 1} \sqrt{\frac{x-1}{x^2+1}}$

(b) $\lim_{x \rightarrow 0} \frac{3^x - 4^x}{x}$

(c) $\lim_{x \rightarrow \infty} \sqrt{\frac{4x+1}{x+1}}$

(3) Find y' : (a) $y = x^4 \cdot 4^x \cdot \sinh x$ (b) $y = \frac{2x+1}{2+\sin x}$

(4) Find y' from the equation: $y + e^x + \ln(3x + 2y) = 0$

(5) Determine the domain of the function $f(x) = x \cos x + \frac{4}{\sqrt{2-x}}$

(1)(a) Write the membership table of the statement: $S = (A - B) \cup (A - C)$

(c) Determine the domain of the function: $f(x) = \frac{3}{x^2 - 4} + 4\ln(x - 1)$

(b) Evaluate the limits: (i) $\lim_{x \rightarrow 2} \frac{\sqrt{x} - \sqrt{2}}{x^2 + 4}$ (ii) $\lim_{x \rightarrow 0} \frac{x + \sin 2x}{x^2 + 3x}$ (iii) $\lim_{x \rightarrow 4} \frac{\ln(x - 3)}{x - 4}$

(2) Find y' and y'' in the following:

(a) $y = 2x^4 + x \cosh 2x$

(b) $y = 8 + (x^2 + 3x)^6$

(c) $y = 3^x + \tan^{-1} x$

(d) $y = \ln(x + \cos x)$

(3)(a) Find y' from the equation: $x^2 + y^2 + x \sin y = 0$

(b) Find y' where $y = 3t + 2\sin t$, $x = 4t + t \cosh t$

(c) Obtain the maximum and minimum points and inflection points of the function:

$$f(x) = \frac{1}{3}x^3 - \frac{5}{2}x^2 + 6x$$

(4)(a) Trace the curve of the function $f(x) = \frac{1}{4}x + \frac{1}{x-1}$

(b) Evaluate the integrals: (i) $\int \frac{x+5}{x^2-4x+3} dx$ (ii) $\int x \ln x dx$

(c) Evaluate the integrals: (i) $\int_1^2 (4x + 3x^2) dx$ (ii) $\int_0^{\pi/2} \cos^2 2x dx$

(5)(a) Evaluate the integral: $\int_1^3 \frac{\ln(2+x)}{x} dx$, using trapezoidal rule, with $\Delta = 0.25$

(b) Find the area of the region bounded by the curves $y = x^2$, $y = 2x$, $x \in [0, 2]$

(c) Evaluate the volume of the solid generated by revolving the region bounded by the curve $y = x^2 + 1$, x-axis and $x \in [0, 2]$ about y-axis.