

Math 101 Term 132

Recitation Session # 1

1. Find the domain of the function

$$f(x) = \frac{\sqrt{x^2 - 9} \sqrt{25 - x^2}}{x - 4}$$

2. Sketch the graph of the function

$$f(x) = \begin{cases} |x| & \text{if } x \leq 2 \\ \frac{1}{2-x} & \text{if } x > 2 \end{cases}$$

then find the domain and range of f .

3. Given $f(x) = 3x - \frac{1}{x} + 5$. If $h \neq 0$, then show that

$$\frac{f(x+h) - f(x)}{h} = 3 + \frac{1}{x(x+h)}$$

4. Factor : $12x^2 + 28xy + 8y^2 - 3x - y$.

5. Solve : $\sin \frac{\theta}{2} + \cos \theta = 1$, $0 \leq \theta \leq 2\pi$

6. If $x = 2 + \frac{2}{3}\sec \theta$, $0 < \theta < \frac{\pi}{2}$, then show that $\frac{3x-6}{\sqrt{9x^2-36x+32}} = \csc \theta$.

Math 102 Term 132

Recitation Session # 1

1. Find each of the following indefinite integrals:

(i) $\int \frac{(3x^2+1)^2}{x} dx,$

(ii) $\int (2e^x - 3e^{-2x}) dx$

(iii) $\int \frac{1-\cos 6x}{2} dx,$

(iv) $\int (\csc^2 x - \csc x \cot x) dx$

2. Verify the formulas given in (A) to (B) by differentiation

A. $\int (3x + 5)^{-2} dx = -\frac{(3x+5)^{-1}}{3} + c$

B. $\int \frac{\tan^{-1} x}{x^2} dx = \ln x - \frac{1}{2} \ln(1 + x^2) - \frac{\tan^{-1} x}{x} + C$

3. Find a formula for the Riemann Sum R_n for the function $f(x) = 1 - x^2$ over the interval $[0,1]$ by dividing the interval $[0,1]$ into n subintervals and using the right-hand end point of each subinterval. Then find $\lim_{n \rightarrow \infty} R_n$ to calculate the area under the graph of f over $[0,1]$.