BSE-20F-022

Qno: 1

Solution:

$\lim_{x \to \infty} x \tan \frac{1}{x}$

Applying limit $x \to \infty$

$\infty \tan \frac{1}{\infty}$

$= \infty \cdot \frac{1}{0}$

$\frac{0}{0}$ undefined.

Applying L.H Rule

diff w.r.t x

$= 1 \sec^2 \frac{1}{x}$

$= \sec^2 \frac{1}{x}$

$= \frac{1}{\cos^2 \frac{1}{x}}$

Applying limit $x \to \infty$

$$= \frac{1}{\cos^2 1/\infty}$$

$$= \frac{1}{1}$$

$$= 1 \text{ Ans}$$

Question no: 2

Solution:

$f(x) = \sin Ax$

Roll no : 022

$A = 2$

$= f(x) = \sin 2x$

$$f(x) = f(a) + f'(a)(x-a) + \frac{f''(a)(x-a)^2}{2!} + \frac{f^n(a)(x-a)^n}{n!}$$

$f(x) = \sin 2x$

$f'(x) = 2\cos 2x$

$f''(x) = -4\sin 2x$

$f'''(x) = -8\cos 2x$

$f''''(x) = 16 \sin 2x$

In ~~macta~~ maclarion series

$x = 0$

$2x = 0$

So

$f(0) = 0$

$f'(0) = 2\cos(2(0)) = 2$

$f''(0) = -4\sin 2((0)) = 0$

$f'''(0) = -8\cos(2(0)) = -8$

$f''''(0) = 16\sin(2(0)) = 0$

Subsituting the value

$$f(x) = 0 + 2(x-0) + \frac{0(x-0)^2}{2!} + \frac{(-8(x-0)^3}{3!} + \frac{0(x-0)^4}{4!}$$

$$\boxed{\sin 2x = 2x - \frac{8x^3}{6}}$$

Ans

Qno:3

Solution

$f(x) = f(1) + f'(1) + \frac{x^2}{2!} f''(1) + \frac{x^3}{3!} f'''(1) + \frac{x^4}{4!} f''''($

$f(x) = 2^x$ $\quad f(1)f = 2^1 = 2$

$f'(x) = 2^x Ln(2)$ $\quad f'(1) = 2^1 Ln(2) = 1.4$

$f''(x) = 2^x Ln^2(2)$ $\quad f''(1) = 2^1 Ln^2(2) = 0.9$

$f'''(x) = 2^x Ln^3(2)$ $\quad f'''(1) = 2^1 Ln^3(2) = 0.6$

$f''''(x) = 2^x Ln^4(2)$ $\quad f''''(1) = 2^1 Ln^4(2) = 0.4$

Substituting the value.

$2^x = 1 + 1.4 + \frac{x^2}{2!}(0.9) + \frac{x^3}{3!}(0.6) + \frac{x^4}{4!}(0.4)$

$2^x = 2.4 + \frac{0.9}{2}x^2 + \frac{0.6}{6}x^3 + \frac{0.4}{24}x^4$

$2^x = 2.4 + 0.4x^2 + 0.1x^3 + 0.01x^4$ Ans