Name: KEY | ID: KEY | Sec: 14 22

MATH-101 Term-131 IN-Class-QUIZ-16

(show all your work and circle one letter to get a full mark or you will get zero)

1) Evaluate $\lim_{x\to 0}\frac{\sin(5x)-5x-x2}{1-\cos(3x)}$ 0/0

(a) -1/2
(b) -3/2
(c) -2/9
(d) -9/2
(e) -2
(f) -9
(g) none of the above

$\overset{L'H}{=} \lim_{x\to 0}\frac{5\cos(5x)-5-2x}{3\sin(3x)}$ 0/0

$\overset{L'H}{=} \lim_{x\to 0}\frac{-25\sin(5x)-2}{9\cos(3x)} = \frac{(0)-2}{9(1)} = -2/9$

2) Evaluate the limit $\lim_{x\to -1^+}\left(\sqrt{4x+4}\ln(x+1)\right)$ is $0\cdot(-\infty)$

(a) 2
(b) -2
(c) 0
(d) *infinity*
(e) - *infinity*
(f) none of the above

$= \lim_{x\to -1^+}\frac{\ln(x+1)}{\frac{1}{\sqrt{4x+4}}} \overset{L'H}{=} \lim_{x\to -1^+}\frac{\frac{1}{x+1}}{-\frac{1}{2}(4x+4)^{-3/2}(4)}$

$= \lim_{x\to -1^+}\frac{\frac{1}{x+1}}{\frac{-2}{(4x+4)^{3/2}}} = \lim_{x\to -1^+}\frac{(4x+4)^{3/2}}{-2(x+1)}$ 0/0

$\overset{L'H}{=} \lim_{x\to -1^+}\frac{\frac{3}{2}(4x+4)^{1/2}}{-2} = \frac{0}{-2} = 0$

3) Evaluate the limit $\lim_{x\to\infty}(1+4x)^{3/\ln x}$ of type ∞^0

(a) e^3
(b) e^12
(c) e^(3/4)
(d) 1
(e) Does not exist
(f) none of the above

$y = \lim_{x\to\infty}(1+4x)^{3/\ln x}$

$\ln y = \lim_{x\to\infty}\left[\frac{3}{\ln x}\ln(1+4x)\right]$

$= \lim_{x\to\infty}\frac{3\ln(1+4x)}{\ln x}$ ∞/∞

$\overset{L'H}{=} \lim_{x\to\infty}\frac{3\left(\frac{4}{1+4x}\right)}{\frac{1}{x}} = \lim_{x\to\infty}\frac{12x}{1+4x}$ ∞/∞

$\overset{L'H}{=} \lim_{x\to\infty}\frac{12}{4} = 3 \Rightarrow \ln y = 3 \Rightarrow y = e^3$