Sardar Vallabhbhai Patel Institute of Technology, Vasad
B. E. First Sem (Mathematics 1)

Tutorial-7

1 Using L' Hospital's Rule, evaluate following Limits:

1) $\lim_{x\to 0}\left[\frac{1}{\sin^2 x}-\frac{1}{x^2}\right]$

2) $\lim_{x\to 0}\frac{\log\sin 2x}{\log\sin x}$

3) $\lim_{x\to 0}\sin x\log x$

4) $\lim_{x\to 0}\frac{\cot x-\frac{1}{x}}{x}$

5) $\lim_{x\to \pi/2}(\cos x)^{\frac{\pi}{2}-x}$

6) $\lim_{x\to 0}\left(\frac{1}{x}\right)^{2\sin x}$

7) $\lim_{x\to 0}\left(\frac{\tan x}{x}\right)^{1/x^2}$

8) $\lim_{x\to 0^+}(1+x)^{1/x}$

9) $\lim_{\theta\to 0}\frac{\left(\frac{1}{2}\right)^{\theta}-1}{\theta}$

10) $\lim_{x\to 0}\frac{\log x}{\cot x}$

11) $\lim_{x\to\frac{\pi}{2}}(\cos ecx)^{\tan^2 x}$

12) $\lim_{x\to \pi/4}\frac{\sin x-\cos x}{x-\pi/4}$

13) $\lim_{x\to 0}\frac{x(\cos x-1)}{\sin x-x}$

14) $\lim_{x\to\frac{\pi}{2}}(\sin x)^{\tan x}$

15) $\lim_{x\to 0} x\tan\frac{1}{x}$

16) $\lim_{x\to 0}\frac{2x-x\cos x-\sin x}{x^3}$

17) $\lim_{x\to a}\frac{\log(x-a)}{\log(e^x-e^a)}$

18) $\lim_{x\to a}\log\left(2-\frac{x}{a}\right)\cot(x-a)$

19) $\lim_{x\to 0}\frac{xe^x-\log(1+x)}{x^2}$

20) $\lim_{x\to 0}\frac{\left[(1+x)^{\frac{1}{x}}-e\right]}{x}$

21) $\lim_{x\to 0}\log_{\tan x}(\tan 2x)$