
Mathematics 170

Tutorial 1

Tuesday Jan. 10, 2006 - Mon. Jan. 16, 2006

1. Evaluate the following limits:

(a) $\lim_{x \rightarrow 1} \frac{x^{\frac{1}{3}} - 1}{x^{\frac{1}{5}} - 1}$

(b) $\lim_{x \rightarrow +\infty} \frac{\ln(e^x + x)}{x}$

(c) $\lim_{x \rightarrow 0^+} \frac{\sqrt{x}}{1 - \cos(x)}$

(d) $\lim_{x \rightarrow +\infty} (e^x) \left(\ln\left(1 + \frac{1}{x}\right) \right)$

(e) $\lim_{x \rightarrow +\infty} x e^{\frac{1}{x}} - x$

(f) $\lim_{x \rightarrow 0^+} (1 - kx)^{\frac{1}{x}}$, where k is a positive constant.
(Express your answer in terms of k .)