ZCA 110 Kalkulus dan Aljabar
Semester I, Sessi 2005/06
QUIZ 9 (23 Sept 2005)
L'Hopital's Rule; Integration of volume

Nama:
No. Kad Matriks:
Kumpulan Tutorial:
[total (3 + 2+ 3) marks = 8 marks]

(a) Evaluate $\lim_{x\to 0^+} \dfrac{e^x - 1}{x^2}$

Solution: SP2(b), pg. 246:

Applying L'Hopital's rule:

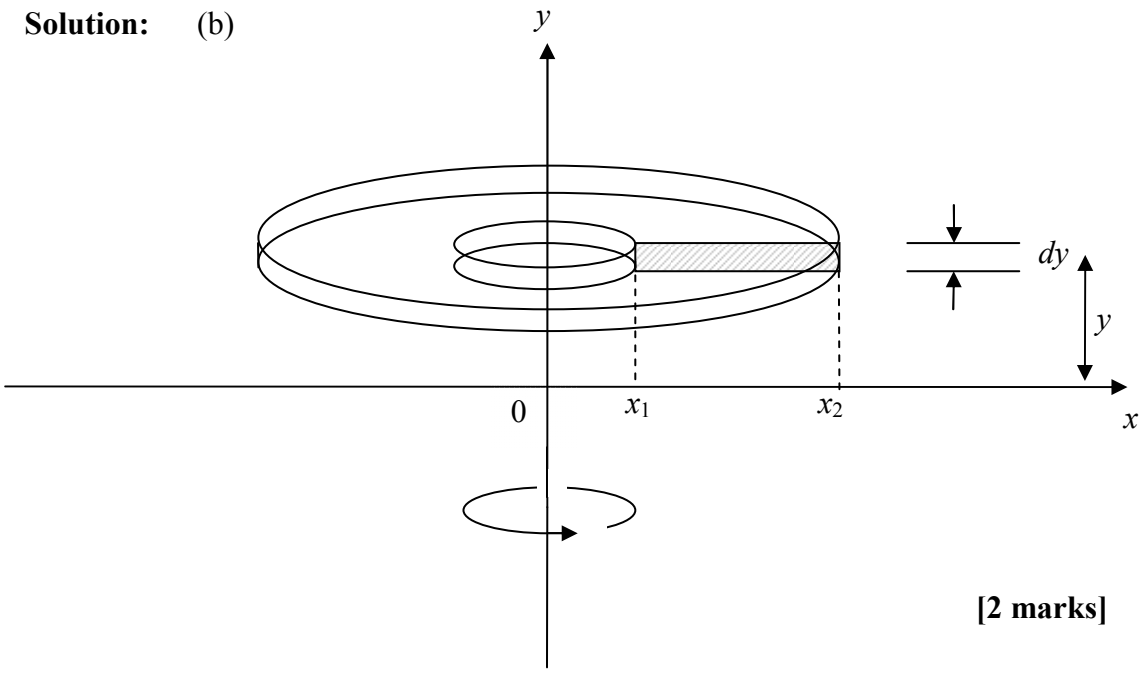
$$\lim_{x\to 0^+} \frac{e^x - 1}{x^2} = \lim_{x\to 0^+} \frac{\frac{d}{dx}\left(e^x - 1\right)}{\frac{d}{dx}\left(x^2\right)} = \frac{1}{2}\lim_{x\to 0^+} \frac{e^x}{x}$$ [2 marks]

$$= +\infty$$ [1 marks]

(b) Sketch in the following diagram the volume generated by the shaded rectangle when revolved about the y-axis.

(c) What is the volume generated by the shaded rectangle when revolved about the y-axis? (Express your answer in terms of x_2, x_1, y, dy).

Solution: (b)



[2 marks]

Solution: (c) $dV = \pi(x_2^2 - x_1^2) \cdot dy$ **[3 marks]**