Solutions to the"QUIZ" for Nov. 6, 2008

1. Evaluate

$$\lim_{x\to+\infty} \frac{x^2-3x+1}{e^{2x}-x} \quad .$$

Solution of 1: We use L'Hôpital twice:

$$\lim_{x\to+\infty} \frac{x^2-3x+1}{e^{2x}-x} = \lim_{x\to+\infty} \frac{2x-3}{2e^{2x}-1} = \lim_{x\to+\infty} \frac{2}{4e^{2x}} \quad .$$

Now is the time to plug-in, and we get:

$$\lim_{x\to+\infty} \frac{2}{4e^{2x}} = \frac{2}{4e^{\infty}} = \frac{1}{2\cdot\infty} = 0 \quad .$$

Ans. to 1: 0 .

Comments: Almost everyone got it right, but very few people messed up the (easy!) differentiations.

2. Evaluate

$$\lim_{x\to\infty} \frac{\ln x}{x} \quad .$$

Solution to 2: By L'Hôpital,

$$\lim_{x\to\infty} \frac{\ln x}{x} = \lim_{x\to\infty} \frac{\frac{1}{x}}{1} = \lim_{x\to\infty} \frac{1}{x} = \frac{1}{\infty} = 0 \quad .$$

Ans. to 2: 0.

Comments: Almost everyone got it right, but a few people said ∞. Remember that $\frac{1}{\infty} = 0$.