Written Homework 7

Evaluate the following limits. For each limit, you must state the initial indeterminate form in the space provided. Use L'Hôpital's Rule where appropriate. If L'Hôpital's Rule does not apply, explain why.

To clearly indicate you have applied L'Hôpital's Rule in your limit evaluation use an "H" above the equal sign like $\overset{\text{H}}{=}$ as is done in the lecture notes for this lesson. Alternatively, you may use appropriate derivative notation to indicate that you have taken derivatives. You do not need to show work to find the derivatives. If necessary, do any derivative calculations off to the side.

1. $\lim_{x \to 1} \dfrac{x^2 - 1}{x^2 - x}$. Indeterminate form: _____

2. $\lim_{x \to 0} \dfrac{e^x - e^{-x} - 2x}{x - \sin x}$. Indeterminate form: _____

3. $\lim_{x\to\infty} x^3 e^{-x^2}$. Indeterminate form: _____

4. $\lim_{x\to\infty} x\sin(\pi/x)$. Indeterminate form: _____

5. $\lim_{x \to 0} \dfrac{\sin(4x)}{\tan(5x)}$. Indeterminate form: _____

6. $\lim_{x \to 0^+} \left(\frac{1}{x} - \frac{1}{e^x - 1} \right)$. Indeterminate form: _____

7. $\lim_{x \to 0^+} x^{\sqrt{x}}$. Indeterminate form: _____

8. $\lim_{x \to 0^+} (4x+1)^{\cot x}$. Indeterminate form: _____

9. $\lim_{x \to 0^+} (1 - 2x)^{1/x}$. Indeterminate form: _____

10. $\lim_{u\to\infty} \dfrac{e^{u/10}}{u^3}$. Indeterminate form: _____