

Each problem is worth 5 points. Clear and complete justification is required for full credit.

1. Evaluate $\lim_{x \rightarrow 0^+} \sqrt{x} \ln x$.

$$\lim_{x \rightarrow 0^+} \frac{\ln x}{x^{-1/2}} \stackrel{\text{in definite } \frac{0}{0}}{=} \lim_{x \rightarrow 0^+} \frac{\frac{1}{x}}{-\frac{1}{2}x^{-3/2}} = \lim_{x \rightarrow 0^+} \frac{-2}{x^{-1/2}}$$

$$\stackrel{\text{L'H}}{=} -2 \lim_{x \rightarrow 0^+} \sqrt{x} \\ = -2(0) \\ = 0$$

Well done!

2. Evaluate $\lim_{x \rightarrow 0} \frac{\sin x}{e^x}$.

$$\lim_{x \rightarrow 0} \frac{\sin x}{e^x} = \frac{\lim_{x \rightarrow 0} \sin x}{\lim_{x \rightarrow 0} e^x} = \frac{\sin 0}{e^0} = \frac{0}{1} = 0$$

Nice

3. Evaluate $\lim_{x \rightarrow 1} \frac{1-x+\ln x}{\sin \pi x}$. Check: $f(1) = 1-1+\ln(1) = 0$ L'Hospital's Rule
 $g(1) = \sin(\pi(1)) = 0$ can be used.

$$\stackrel{\text{L'H}}{=} \lim_{x \rightarrow 1} \frac{-1 + 1/x}{\pi \cdot \cos \pi x} = \boxed{0}$$

Excellent!