MATH 3D Prep: Improper Integration

Facts to Know:

For simplicity, assume all functions in this section are defined , continuous and differentiable on $[0, \infty)$.

1. Definition:
   - $\int_0^\infty f(x)dx =$
   - Let $F(x)$ be antiderivative of $f(x)$, then $\int_0^\infty f(x)dx$ converges if _____.
   - If converges, $\int_0^\infty f(x)dx =$
2. l-Hoptal's Rule:
   - Computes $\lim_{x\to\infty} \frac{f(x)}{g(x)}$, when the limit is _____ or _____.
   - $\lim_{x\to\infty} \frac{f(x)}{g(x)} =$

Examples:

1. Evaluate $\int_0^\infty e^{-3t}dt$

2. Evaluate $\int_0^\infty te^{-t}dt$