

Class prep quiz on section 4.4, Stewart's Calculus (8th ed.)

1. Suppose f, g, h, k are differentiable functions such that

$$\begin{aligned} \lim_{x \rightarrow 0} f(x) = 0, \quad \lim_{x \rightarrow 0} g(x) = 0, \quad \lim_{x \rightarrow 0} h(x) = +\infty, \quad \lim_{x \rightarrow 0} k(x) = +\infty, \\ \lim_{x \rightarrow \infty} f(x) = 0, \quad \lim_{x \rightarrow \infty} g(x) = 0, \quad \lim_{x \rightarrow \infty} h(x) = +\infty, \quad \lim_{x \rightarrow \infty} k(x) = -\infty. \end{aligned}$$

Which of the following limits **CANNOT** be computed using l'Hôpital's Rule?

(a) $\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)}$ (b) $\lim_{x \rightarrow 0} \frac{h(x)}{k(x)}$ (c) $\lim_{x \rightarrow \infty} \frac{h(x)}{g(x)}$ (d) $\lim_{x \rightarrow \infty} \frac{h(x)}{k(x)}$

2. If you use l'Hôpital's Rule to calculate $\lim_{x \rightarrow \infty} \frac{4x^3 - x^2 + 7}{7x^3 + 14x - 13}$, what do you get?

- (a) $4/7$ (b) $1/2$ (c) 1
(d) L'Hôpital's Rule cannot be used to calculate this limit.

3. If you use l'Hôpital's Rule to calculate $\lim_{x \rightarrow 0} \frac{\cos x - 1}{x \sin(3x)}$, what do you get?

- (a) $1/6$ (b) $-1/6$ (c) 1
(d) L'Hôpital's Rule cannot be used to calculate this limit.

4. If you use l'Hôpital's Rule to calculate $\lim_{x \rightarrow \infty} \frac{x}{3^x}$, what do you get?

- (a) $+\infty$ (b) 0 (c) 1
(d) L'Hôpital's Rule cannot be used to calculate this limit.