4.7 / Practice workbook

L'Hospital's Rule

Practice

Problems 1–5 / Show your reasoning

1

What is $\lim_{x \to 2} \dfrac{x^3 - 8}{\ln(x - 1)}$?

A. 0
B. 4
C. 12
D. nonexistent

4.7 / AP-style free response

Problem 2 ➤ */ Show the work and the reasons a grader looks for.*

The functions f and g have continuous derivatives. $f(3) = 0$, $f'(3) = 4$, $g(3) = 0$, and $g'(3) = -2$.

(a) Find $\lim_{x \to 3} \dfrac{f(x)}{g(x)}$. Show that L'Hospital's rule applies.

(b) Find $\lim_{x \to 3} \dfrac{f(x) + x - 3}{x^2 - 9}$.

3 What is $\lim_{x\to\infty} \frac{2e^x + x}{3e^x - 1}$?

A. 0
B. $\frac{2}{3}$
C. 1
D. ∞

4.7 / AP-style free response

Problem 4 ➤ */ Show the work and the reasons a grader looks for.*

Find $\lim_{x \to 0} \dfrac{x - \sin x}{x^3}$. Check the form before each use of L'Hospital's rule.

4.7 / AP-style free response

Problem 5 ➤ */ Show the work and the reasons a grader looks for.*

A student writes $\lim_{x\to 0} \dfrac{e^x+1}{x+1} = \lim_{x\to 0} \dfrac{e^x}{1} = 1$.

(a) Explain the student's mistake.

(b) Find the limit.

4.7 / Answer key

L'Hospital's Rule

1 (C)

2 (a) -2; (b) $\frac{5}{6}$

3 (B)

4 $\frac{1}{6}$

5 (a) The limit is not an indeterminate form: the top approaches 2 and the bottom approaches 1, so the rule does not apply; (b) 2