

AP Calculus AB - Introducing Limits - Test

Common Core AP CALC AB 1.1, AP CALC AB 1.2, AP CALC AB 1.3, AP CALC AB 1.4 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

This test checks estimating limits from tables and graphs, one-sided limits and the cases where a limit does not exist (AP Calculus AB, 1.1, 1.2, 1.3, 1.4). It has 8 questions worth 20 points in total. Allow 45 minutes, work without notes, and show all work, since justification earns points on the AP exam.

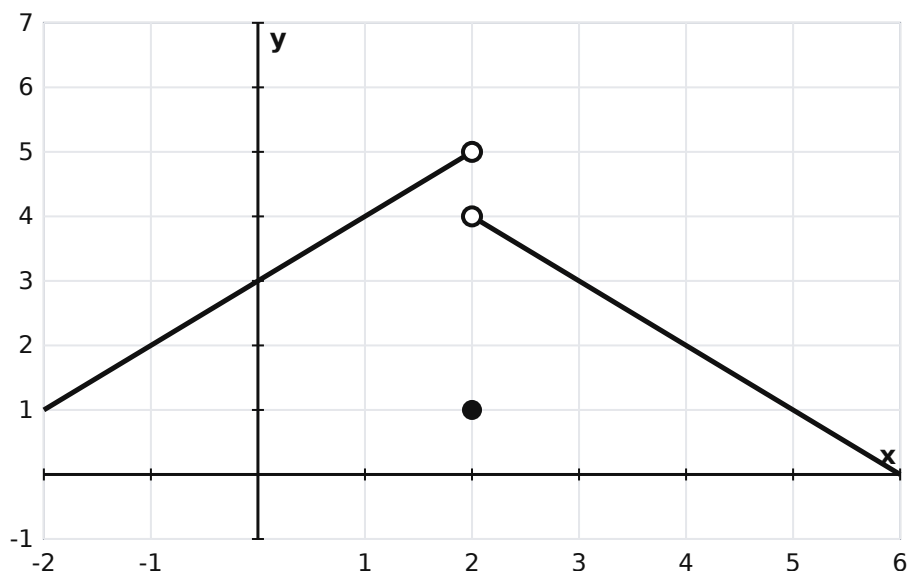
About this test

- Grade: AP Calculus AB
- Chapter: Introducing Limits
- Standards: AP CALC AB 1.1, AP CALC AB 1.2, AP CALC AB 1.3, AP CALC AB 1.4
- Time: 45 minutes
- Total: 20 points

Question 1 - Estimating from a table [2 pts]

Complete a table for $f(x) = \frac{x^3 - 8}{x - 2}$ at $x = 1.9, 1.99, 2.01, 2.1$ and estimate $\lim_{x \rightarrow 2} f(x)$.

Question 2 - Reading a graph [2 pts]



Graph of f near $x = 2$.

Use the graph of f . Find: (a) $\lim_{x \rightarrow 2^-} f(x)$ (b) $\lim_{x \rightarrow 2^+} f(x)$ (c) $f(2)$ (d) $\lim_{x \rightarrow 2} f(x)$. (2 points)

Question 3 - Piecewise function [2 pts]

Let $f(x) = 4 - x^2$ for $x < -1$ and $f(x) = 2x + 5$ for $x \geq -1$. Does $\lim_{x \rightarrow -1} f(x)$ exist? Justify.

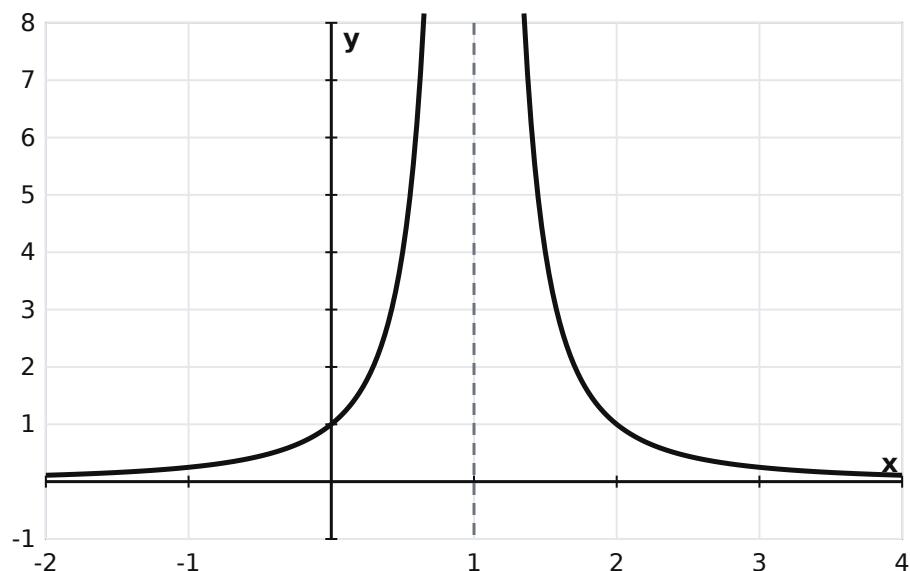
Question 4 - Parameter for a limit [3 pts]

Let $f(x) = kx - 2$ for $x < 3$ and $f(x) = x^2 - 5$ for $x \geq 3$. Find the value of k so that $\lim_{x \rightarrow 3} f(x)$ exists, and state the limit.

Question 5 - Instantaneous speed [2 pts]

A sprinter's distance in meters is $s(t) = 5t^2$ after t seconds. Find the average speed on $[2, 2.1]$, $[2, 2.01]$ and $[2, 2.001]$, then estimate the speed at $t = 2$.

Question 6 - Unbounded behavior [3 pts]



The graph of $k(x) = 1/(x - 1)^2$.

The graph shows $k(x) = \frac{1}{(x-1)^2}$. (a) Describe the outputs as $x \rightarrow 1^-$ and as $x \rightarrow 1^+$. (1 point) (b) Does $\lim_{x \rightarrow 1} k(x)$ exist as a real number? Explain. (1 point) (c) Find $k(0.9)$ and $k(1.1)$. (1 point)

Question 7 - Taxi fare jump [3 pts]

A taxi fare in dollars is $F(d) = 8$ for $0 < d \leq 1$ miles and $F(d) = 11$ for $1 < d \leq 2$ miles. (a) Find $\lim_{d \rightarrow 1^-} F(d)$ and $\lim_{d \rightarrow 1^+} F(d)$. (2 points) (b) Does $\lim_{d \rightarrow 1} F(d)$ exist? Why? (1 point)

Question 8 - Table and conclusion [3 pts]

x	-0.1	-0.01	-0.001	0.001	0.01	0.1
h(x)	-1	-1	-1	1	1	1

Values of h near $x = 0$.

The table shows values of h near $x = 0$. (a) Estimate the left-hand and right-hand limits at 0. (2 points) (b) State whether $\lim_{x \rightarrow 0} h(x)$ exists and justify. (1 point)