

AP Calculus AB - Infinite Limits and Asymptotes - Test

Common Core AP CALC AB 1.13, AP CALC AB 1.14, AP CALC AB 1.15 · maths-pdf.fr/en/

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

This test checks infinite limits, vertical and horizontal asymptotes, and limits at infinity (AP Calculus AB, 1.13, 1.14, 1.15). 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: Infinite Limits and Asymptotes
- Standards: AP CALC AB 1.13, AP CALC AB 1.14, AP CALC AB 1.15
- Time: 45 minutes
- Total: 20 points

Question 1 - One-sided infinite limits [2 pts]

Find $\lim_{x \rightarrow 5^+} \frac{-2}{x-5}$ and $\lim_{x \rightarrow 5^-} \frac{-2}{x-5}$.

Question 2 - Vertical asymptotes [2 pts]

Find all vertical asymptotes of $f(x) = \frac{x-1}{x^2-1}$ and state where there is a hole.

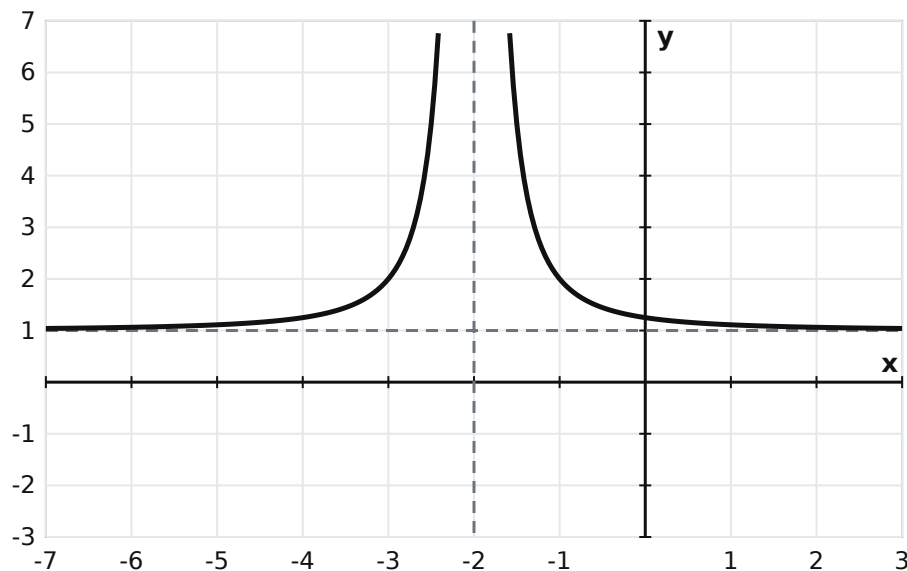
Question 3 - Limits at infinity [3 pts]

Find each limit. (a) $\lim_{x \rightarrow \infty} \frac{7x^2-x}{2x^2+5}$ (b) $\lim_{x \rightarrow \infty} \frac{3x-4}{x^3+1}$ (c) $\lim_{x \rightarrow \infty} \frac{x^4}{x^2+9}$.

Question 4 - Both directions [2 pts]

Find $\lim_{x \rightarrow \infty} \frac{2x}{\sqrt{x^2+1}}$ and $\lim_{x \rightarrow -\infty} \frac{2x}{\sqrt{x^2+1}}$.

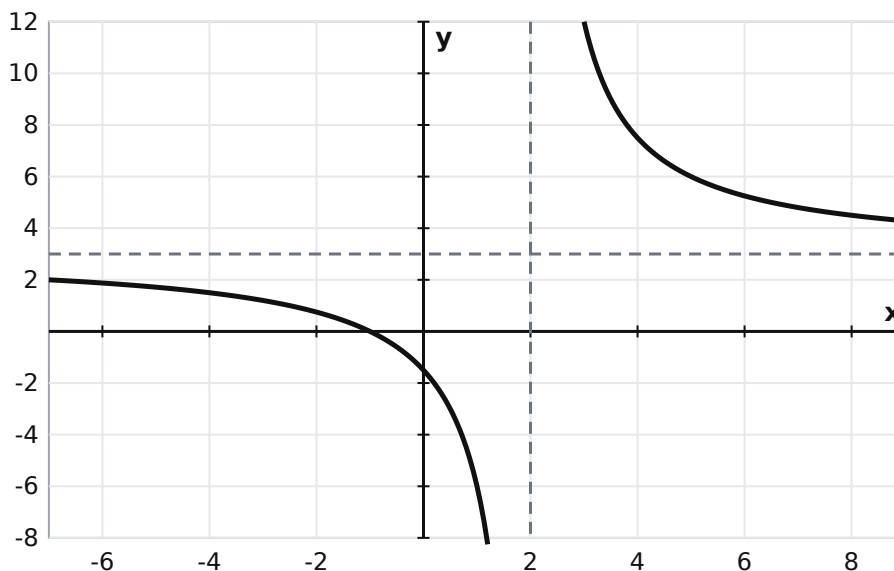
Question 5 - Reading asymptotes [3 pts]



The graph of g .

The graph shows $g(x) = \frac{1}{(x+2)^2} + 1$. (a) State $\lim_{x \rightarrow -2} g(x)$. (1 point) (b) State $\lim_{x \rightarrow \infty} g(x)$ and $\lim_{x \rightarrow -\infty} g(x)$. (1 point) (c) Write the equations of both asymptotes. (1 point)

Question 6 - All asymptotes [3 pts]



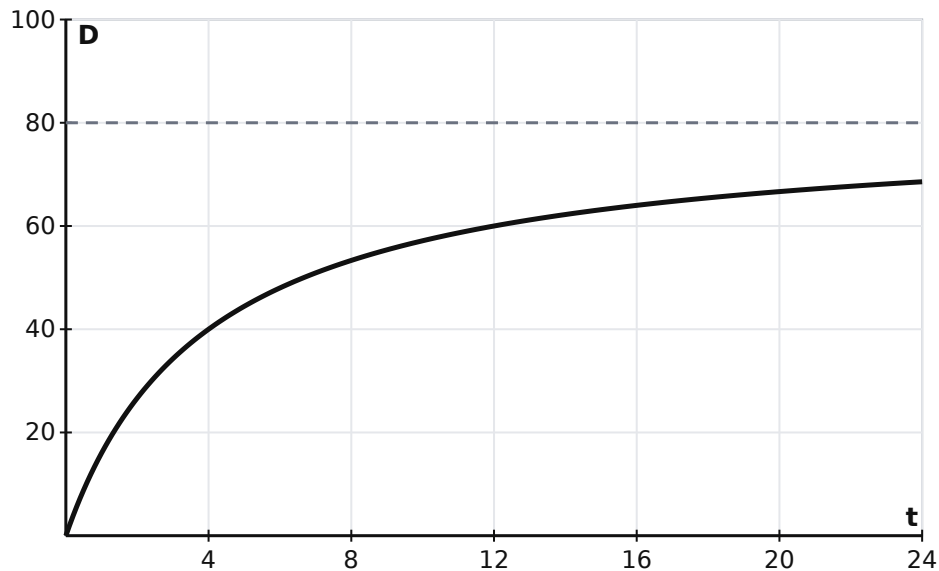
The graph of $r(x) = 3(x+1)/(x-2)$.

Let $r(x) = \frac{3x+3}{x-2}$. Find the vertical asymptote, the horizontal asymptote and both intercepts. Use the graph to check.

Question 7 - Average cost [2 pts]

A bakery's average cost per loaf is $A(n) = \frac{3n+90}{n}$ dollars when it bakes n loaves. (a) Find $A(30)$. (1 point) (b) Find $\lim_{n \rightarrow \infty} A(n)$ and interpret it. (1 point)

Question 8 - Leveling off [3 pts]



Distance a drone travels, approaching a limit.

The speed of a cooling fan in rpm is modeled by $D(t) = \frac{80t}{t+4}$ after t seconds. (a) Find $D(4)$. (1 point) (b) Find $\lim_{t \rightarrow \infty} D(t)$. (1 point) (c) Explain what the limit means for the fan. (1 point)