

Precalculus - Introduction to Limits - Quiz

Common Core F-IF.B.6, F-IF.C.7d · maths-pdf.fr/en/

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

Pick the best answer for 10 questions on limits and continuity. Explanations name common mistakes, such as thinking a hole means the limit does not exist.

Precalculus · Common Core State Standards: **F-IF.B.6, F-IF.C.7d**

Questions

Question 1

What is the average rate of change of $f(x) = x^2$ from 0 to 4?

- A. 16
- B. 4
- C. 2
- D. 8

Question 2

Evaluate $\lim_{x \rightarrow 3} (2x+5)$.

- A. 5
- B. 11
- C. 6
- D. does not exist

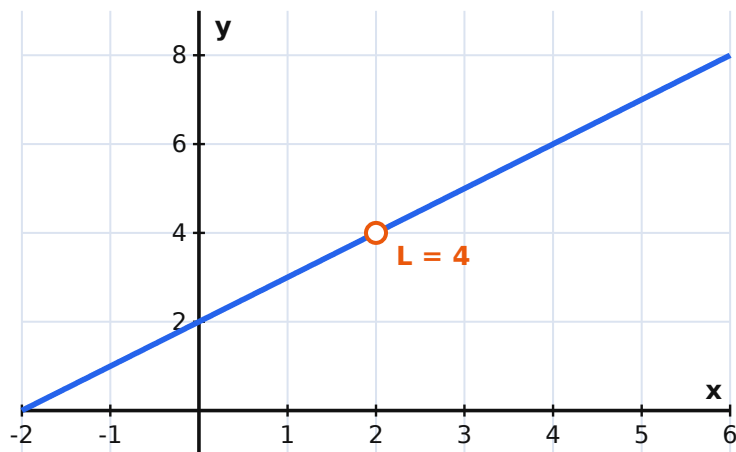
Question 3

Evaluate $\lim_{x \rightarrow 2} \frac{x^2-4}{x-2}$.

- A. 4
- B. 0
- C. 2
- D. does not exist

Question 4

The graph shows a hole. What is the limit as $x \rightarrow 2$?

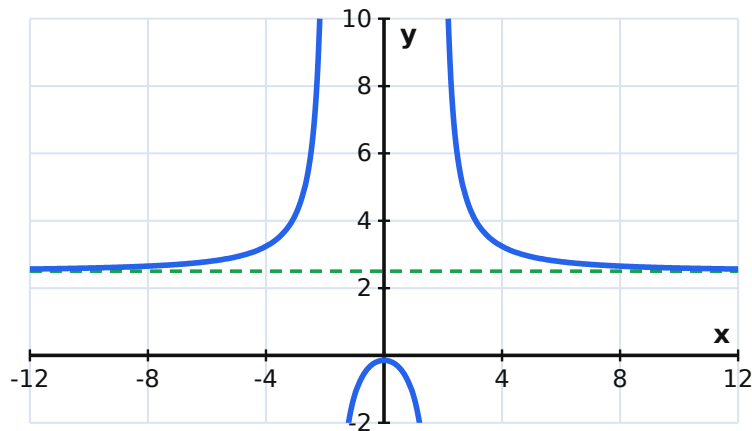


Graph with a hole.

- A. 2
- B. undefined
- C. 0
- D. 4

Question 5

Evaluate $\lim_{x \rightarrow \infty} \frac{5x^2+1}{2x^2-7}$, which is the height of the horizontal asymptote.

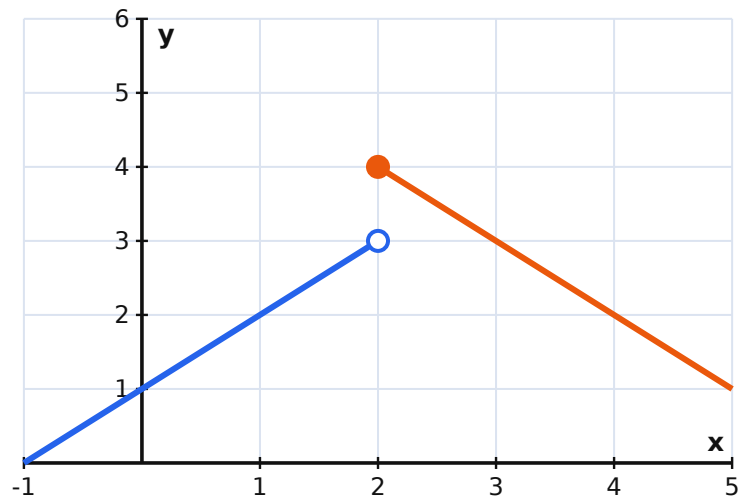


Graph with a horizontal asymptote.

- A. 5
- B. 0
- C. $\frac{5}{2}$
- D. infinity

Question 6

The graph shows a jump at $x=2$. What can you say about $\lim_{x \rightarrow 2} f(x)$?



Left limit 3 and right limit 4.

- A. It equals 3
- B. It does not exist
- C. It equals 4
- D. It equals 7

Question 7

For $f(x) = x^2$, the average rate of change on $[2, 2+h]$ is...

- A. $4h + h^2$
- B. $2 + h$
- C. $4 + h$
- D. 4

Question 8

Which describes a removable discontinuity?

- A. A hole in the graph
- B. A vertical asymptote
- C. A jump between pieces
- D. A sharp corner

Question 9

As $x \rightarrow \infty$, the concentration $C(t) = \frac{5t}{t+2}$ approaches...

- A. 0
- B. 2
- C. infinity
- D. 5

Question 10

What does $\lim_{x \rightarrow a^+} f(x)$ mean?

- A. The value $f(x)$ approaches as x gets close to a from the right
- B. The value of $f(a)$
- C. The value $f(x)$ approaches from the left
- D. The slope of the tangent at a

Answers

1. **B** - $(16 - 0)/(4 - 0) = 4$.
2. **B** - Polynomials are continuous, so substitute $x = 3$: 11.
3. **A** - Cancel $x - 2$ to get $x + 2$, which approaches 4.
4. **D** - The function values approach height 4 near $x = 2$, even though $f(2)$ is undefined.
5. **C** - Equal degrees: divide the leading coefficients.
6. **B** - The one-sided limits (3 and 4) differ, so the two-sided limit does not exist.
7. **C** - $((2 + h)^2 - 4)/h = (4h + h^2)/h = 4 + h$.
8. **A** - A hole can be filled by redefining the one point to equal the limit.
9. **D** - The leading coefficients give $5/1 = 5$, shown by the horizontal asymptote.
10. **A** - The plus sign means we use only x -values greater than a .

Remember

- Average rate of change: $(f(b) - f(a))/(b - a)$, the secant slope.
- $\lim_{x \rightarrow a} f(x) = L$ means $f(x)$ approaches L as x approaches a from both sides.
- The limit can exist even if $f(a)$ is undefined (a hole).
- Two-sided limit exists only if the left and right limits are equal.
- f is continuous at a if $f(a)$ exists, the limit exists and they are equal.