MATHS

BOOKS - INDEPENDENTLY PUBLISHED MATHS (ENGLISH)

RATIONAL FUNCTIONS

Examples

1. Sketch the graph of $f(x) = \dfrac{x^2 - 1}{x + 1}$.

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2. Sketch the graph of $f(x) = \dfrac{1}{x-2}$.

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3. What does $\lim\limits_{x \to 1} \dfrac{x^2 - 1}{x + 1}$ equal ?

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4. What does $\lim\limits_{x \to 2^+} 3x + 5$ equal ?

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5. What does $\lim\limits_{x \to 2} \left(\dfrac{3x^2 + 5}{x - 2} \right)$ equal?

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6. If $f(x) = \begin{cases} 3x + 2 & \text{when } x \neq 0 \\ 0 & \text{when } x = 0 \end{cases}$, what does $\lim\limits_{x \to 0} f(x)$ equal ?

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7. What does $\displaystyle\lim_{x \to \infty} \left(\frac{3x^2 + 4x + 2}{2x^2 + x - 5} \right)$ equal ?

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Exercises

1. To be continuous at $x = 1$, the value of $\dfrac{x^4 - 1}{x^3 - 1}$ must be defined to be equal to

    A. -1

    B. 0

C. 1

D. $\dfrac{4}{3}$

Answer: D

2. If $f(x) = \begin{cases} \dfrac{3x^2 + 2x}{x} & \text{when } x \neq 0 \\ k & \text{when } x = 0 \end{cases}$, what must the value of k be equal to in order for f(x) to be a continuous function?

A. $-\dfrac{3}{2}$

B. $-\dfrac{2}{3}$

C. 0

D. 2

Answer: D

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3. $\lim\limits_{x \to 2} \left(\dfrac{x^3 - 8}{x^4 - 16} \right) =$

A. 0

B. $\dfrac{3}{8}$

C. $\dfrac{1}{2}$

D. $\dfrac{4}{7}$

Answer: B

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4. $\displaystyle\lim_{x \to \infty} \left(\dfrac{5x^2 - 2}{3x^2 + 8} \right) =$

A. $-\dfrac{1}{4}$

B. 0

C. $\dfrac{3}{11}$

D. $\dfrac{5}{3}$

Answer: D

5. Which of the following is the equation of an asymptote of $y = \dfrac{3x^2 - 2x - 1}{9x^2 - 1}$?

A. $x = -\dfrac{1}{3}$

B. $x = 1$

C. $y = -\dfrac{1}{3}$

D. $y = \dfrac{1}{3}$

Answer: D