CHAPTER 3.6

Rational Functions and Their Graphs

Multiple-Choice Old Exam Questions

9 questions • 3 topics • options A–E • two questions per page

Topic 1 | Finding Constants from Asymptotes

Using vertical and horizontal asymptotes to determine unknown constants • Questions 1–4

Q **1**

If $y = 3$ is the horizontal asymptote of the function $f(x) = \frac{ax+12}{2x-5}$, then the x-intercept of the graph of f is

A) -2

B) $-\frac{1}{2}$

C) $\frac{5}{2}$

D) 3

E) 6

Q **2**

If $x = 2$ is the vertical asymptote of the function $r(x) = \frac{3-(a+1)x}{4-ax}$, then its horizontal asymptote is

A) $y = \frac{3}{2}$

B) $y = -\frac{2}{3}$

C) $y = \frac{3}{4}$

D) $y = 3$

E) $y = 2$

Q
3

If the graph of $f(x) = \frac{(2a-1)x+1}{ax-6}$ has the line $x = 2$ as a vertical asymptote, then it has the horizontal asymptote

A) $y = \frac{5}{3}$

B) $y = \frac{2}{3}$

C) $y = \frac{3}{2}$

D) $y = \frac{1}{3}$

E) $y = 2$

Q
4

If $y = \frac{5}{3}$ is the horizontal asymptote of the function $f(x) = \frac{10x^2-13x-3}{kx^2-5x-6}$, then the x-intercept of the graph of $f(x)$ is

A) $-\frac{1}{5}$

B) $-\frac{3}{2}$

C) $-\frac{2}{3}$

D) $\frac{3}{2}$

E) $\frac{3}{5}$

Topic 2 | Graphs of Rational Functions

Reading the asymptotes and intercepts from a graph • Questions 5–6

Q 5

If the graph of the rational function $f(x) = \frac{ax+c}{1-bx}$ is as shown, then the value of $a + b + c$ is equal to

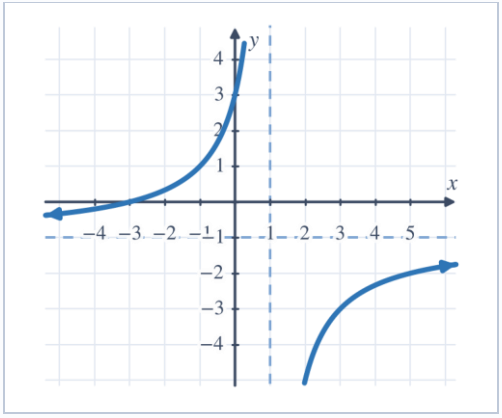
A) 5

B) -1

C) -2

D) 6

E) 1



Q 6

Which one of the following functions has the graph shown?

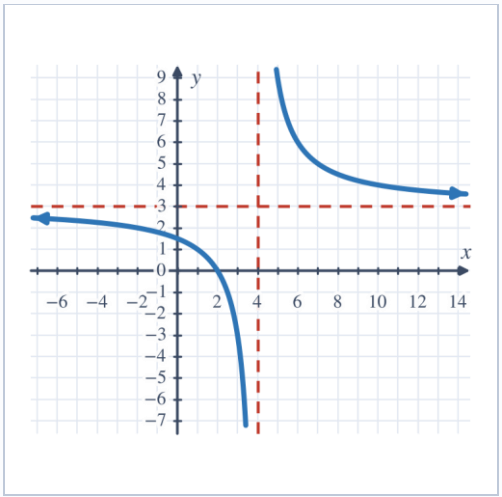
A) $f(x) = \frac{3-x}{4-x}$

B) $f(x) = \frac{2-3x}{4-x}$

C) $f(x) = \frac{x-3}{x-4}$

D) $f(x) = \frac{6-3x}{4-x}$

E) $f(x) = \frac{3x-12}{4x-16}$



Topic 3 | Asymptotes of a Rational Function

Identifying vertical and horizontal asymptotes, and when a horizontal asymptote exists • Questions 7–9

Q **7**

If $y = -3$ is a horizontal asymptote of the graph of $g(x) = \frac{(Ax^2+x+2)(x+3)}{(2x^2-x-1)(x-3)}$, then the vertical asymptotes

A) are $x = 1$ and $x = 3$

B) is $x = 1$

C) are $x = 1$ and $x = -\frac{1}{2}$

D) are $x = 1$ and $x = \frac{1}{2}$

E) is $x = \frac{1}{2}$

Q **8**

The asymptotes of the graph of the function $f(x) = \frac{x^2-x-2}{x^2+x-6}$ are

A) one vertical and one horizontal

B) two vertical and one horizontal

C) two vertical asymptotes

D) one horizontal asymptote only

E) one vertical and two horizontal

Q
9

The rational function $f(x) = \frac{ax^2+2x+1}{bx-4}$ has a horizontal asymptote if

A) $a = 0,\ b \neq 0$

B) $a \neq 0,\ b = 0$

C) $a \neq 0,\ b \neq 0$

D) $a = 0,\ b = 0$

E) $a,\ b$ are any real numbers

Answer Key

"Original" shows the question number in the source worksheet.

Q	Original	Ans.	Value
1	1	**A**	-2
2	2	**A**	$y = \frac{3}{2}$
3	3	**A**	$y = \frac{5}{3}$
4	9	**A**	$-\frac{1}{5}$
5	4	**A**	5
6	8	**D**	$f(x) = \frac{6-3x}{4-x}$
7	5	**A**	are $x = 1$ and $x = 3$
8	6	**A**	one vertical and one horizontal
9	7	**A**	$a = 0,\ b \neq 0$