

Chapter 9 Test

Multiple Choice

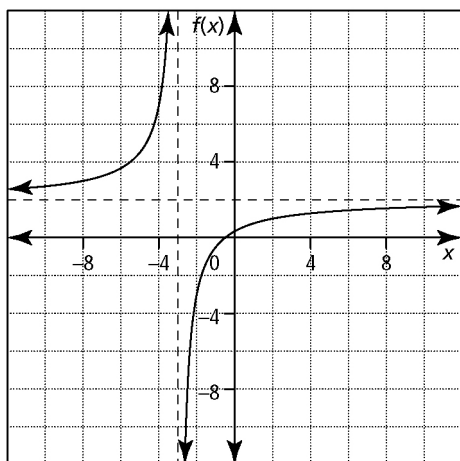
For #1 to #8, choose the best answer.

1. The x -intercept of $y = \frac{k}{x+1} - 2$ is 0.5. What is the value of k ?
- A 1.0 B 1.5
C 2.5 D 3.0

2. Consider the function $g(x) = \frac{2x}{1-x^2}$. Which statement is false?
- A $g(x)$ has two vertical asymptotes.
B $g(x)$ is not defined when $x = 0$.
C $g(x)$ has one zero.
D $g(x)$ is a rational function.

3. Consider the functions $f(x) = x - x^2$, $g(x) = 2x - 1$, and $h(x) = \frac{f(x)}{g(x)}$. Which statement is true?
- A $f(x)$, $g(x)$, and $h(x)$ have the same domain.
B The zero of $f(x)$ is the vertical asymptote of $h(x)$.
C The non-permissible value of $h(x)$ is the zero of $g(x)$.
D $h(x)$ is equivalent to $y = -0.5x + 0.25$.

4. Consider the following graph of the function $f(x) = \frac{2x+1}{x+r}$.



What is the value of r ?

- A -3 B -2
C 2 D 3

5. Which of the following is true of the rational function $y = \frac{3}{x-2} + 6$?

- A It has a zero at $x = 2$.
B Its range is $\{y \mid y \in \mathbb{R}\}$.
C It is equivalent to $y = \frac{6x-9}{x-2}$.
D It has a vertical asymptote at $x = 6$.

6. The graph of which function has a point of discontinuity at $x = 1$?

- A $y = \frac{x-1}{x^2-1}$ B $y = \frac{x+1}{x^2-1}$
C $y = \frac{x^2-1}{x+1}$ D $y = \frac{x^2+1}{x-1}$

7. Which function has a domain of $\{x \mid x \neq 1, x \in \mathbb{R}\}$ and a range of $\{y \mid y \neq 3, y \in \mathbb{R}\}$?

- A $y = \frac{x}{x-1} + 3$ B $y = \frac{3x^2-3x}{x^2-4x+3}$
C $y = \frac{3x}{x-1}$ D $y = \frac{3x^2}{x^2-x}$

8. How many roots does the equation $\frac{8}{x^2-16} + 1 = \frac{1}{x-4}$ have?

- A 0 B 1
C 2 D 3

Short Answer

9. a) Sketch the graph of the function

$$y = \frac{x+2}{x^2-4}$$

- b) Identify the domain, range, and asymptotes of the function.
c) Explain the behaviour of the function as the value of $|x|$ becomes very large.

10. a) Sketch the graph of the function

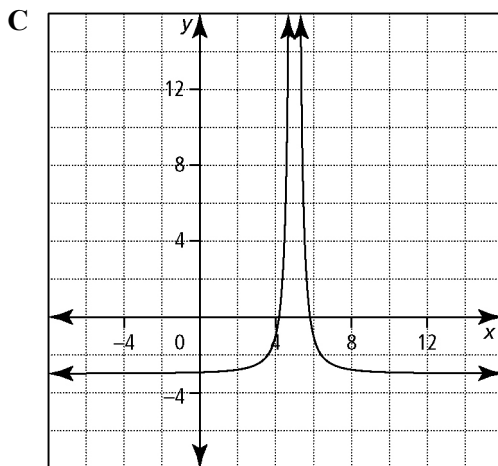
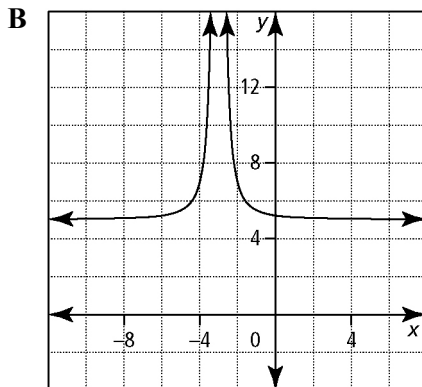
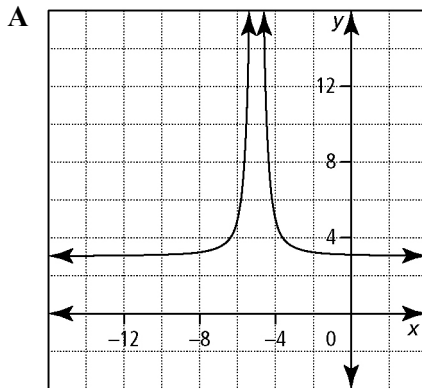
$$y = \frac{2}{x-5} + 1$$

- b) State the values of the x -intercept and y -intercept.
c) Solve $0 = \frac{2}{x-5} + 1$ algebraically.
d) How is your answer to part c) related to your answers to parts a) and b)?



11. Select the graph that matches the given function.

a) $y = \frac{2}{(x+3)^2} + 5$ b) $y = \frac{2}{(x+5)^2} + 3$
c) $y = \frac{2}{(x-5)^2} - 3$



12. a) Solve the equation $7x + 11 = \frac{x-3}{2x+1}$ algebraically.
b) Check your answer to part a) graphically.

Extended Response

13. a) Graph the functions $f(x) = \frac{2}{x}$ and $g(x) = \frac{3x-1}{x-1}$. Use a table to compare the characteristics of the two graphs.
b) Write $g(x)$ as a transformation of $f(x)$: $g(x) = f(x+a) + b$.
c) Describe the transformation of $f(x)$ to $g(x)$.
14. a) Describe two methods you could use to solve the equation $2(2x+1) = \frac{3x^2-12x-5}{x-4}$ graphically.
b) Use one of the methods from part a) to solve the equation.
15. A rectangle has an area of 6000 cm^2 .
a) Write an equation to represent length, l , as a function of the width, w , for this rectangle.
b) Write an equation to represent the change in length, as a function of width, w , when the width is increased by 1 cm.
c) Determine the width, w , of the rectangle if the change in length is 10 cm.
16. An emergency patrol boat is patrolling a river. The river has a 5 km/h current. The patrol boat travels 10 km upriver and 10 km back. The total time, t , in hours, for the round trip is given by the function $t = \frac{20v}{v^2-25}$, where v is the speed of the boat in kilometres per hour.
a) State the domain and range for this function.
b) Sketch the graph over the domain determined in part a).
c) Determine the speed of the boat if the round trip took 1.5 h.

