

Multiple Choice: Identify the choice that best completes the statement or answers the question.

1. Find the x - and y -intercepts of the rational function

$$r(x) = \frac{x^3 + 27}{x^2 + 9}$$

- a. x -intercept $(-3, 2)$, y -intercept $(0, 3)$
- b. x -intercepts $(3, 0)$, $(-3, 0)$, y -intercept $(0, 3)$
- c. x -intercept $(0, 0)$, y -intercept $(0, 6)$
- d. x -intercept $(-3, 0)$, y -intercept $(0, 3)$
- e. x -intercepts $(3, 0)$, $(-3, 0)$, y -intercepts $(0, 3)$, $(0, -3)$

2. Find the horizontal and vertical asymptotes of the rational function $r(x) = \frac{7}{x+8}$.

$$r(x) = \frac{7}{x+8}$$

- a. horizontal asymptote $y = 7$; vertical asymptote $x = 8$
- b. horizontal asymptote $y = 7$; vertical asymptote $x = -8$
- c. horizontal asymptote $y = 0$; vertical asymptote $x = -16$
- d. horizontal asymptote $y = 0$; vertical asymptote $x = -8$
- e. horizontal asymptote $y = 0$; vertical asymptote $x = 8$

3. Given $f(x) = \frac{-2}{x-8}$ and $x \rightarrow 8^+$, then $f(x) \rightarrow$

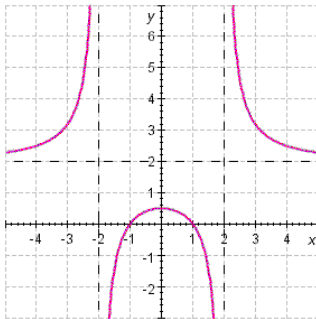
- a. ∞
- b. $-\infty$
- c. 8
- d. -2

4. Given $f(x) = \frac{3x-2}{x+7}$ and $x \rightarrow \infty$, then $f(x) \rightarrow$

- a. ∞
- b. $-\infty$
- c. 3
- d. -7

Free Response

5. Determine the equation of the function whose graph is:



6. Find all asymptotes (if any). $r(x) = \frac{x^2 + 4x}{x^2 - 4}$

7. Find the intercepts and asymptotes. $s(x) = \frac{5x-5}{(x-5)(x+1)}$

- (a) Determine the x -intercept(s).
- (b) Determine the y -intercept(s).
- (c) Determine the vertical asymptote(s).
- (d) Determine the horizontal asymptote(s).

8. Find the intercepts and asymptotes.

$$r(x) = \frac{x^2 - 18x + 81}{x^2 + 6x + 9}$$

- (a) Determine the x -intercept(s).
- (b) Determine the y -intercept(s).
- (c) Determine the vertical asymptote(s).
- (d) Determine the horizontal asymptote(s).

9. Find the intercepts and asymptotes.

$$r(x) = \frac{3x^2 + 9}{x^2 - 2x - 3}$$

- (a) Determine the x -intercept(s).
- (b) Determine the y -intercept(s).
- (c) Determine the vertical asymptote(s).
- (d) Determine the horizontal asymptote(s).

Graph the following:

10. $s(x) = -\frac{3}{x+2}$

11. $r(x) = \frac{3x-11}{x-4}$

12. $r(x) = \frac{x-4}{x^2-9x}$

13. $r(x) = \frac{5x^2+7}{x^2-2x-8}$

14. $f(x) = \frac{x^2+1}{x^2-1}$

15. $f(x) = \frac{2}{2x^2-x-3}$

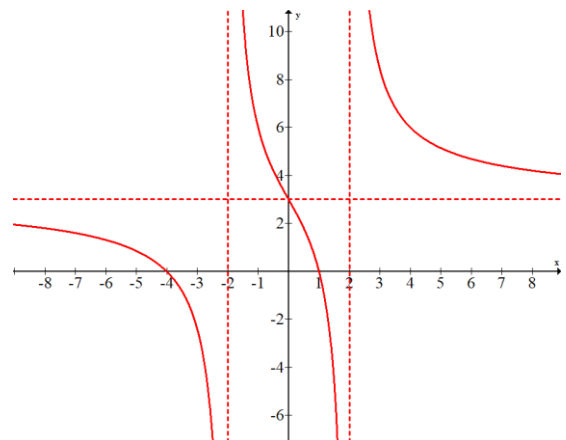
16. $f(x) = \frac{x^2-4}{x^2-4x+4}$

17. $f(x) = \frac{4x-2}{x^2+5x-6}$

18. $f(x) = \frac{x-2}{x^2-2x-3}$

19. $f(x) = \frac{3x^2-12}{4-x^2}$

20. Determine the equation



Answer Section

1. D
2. D
3. B
4. C

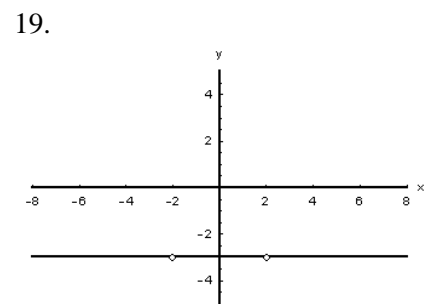
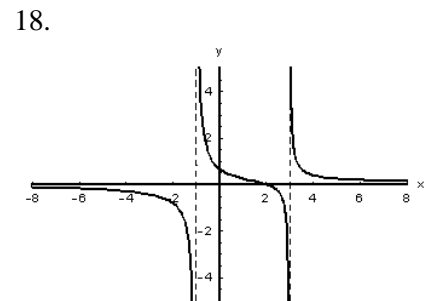
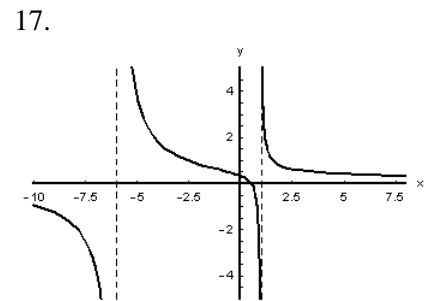
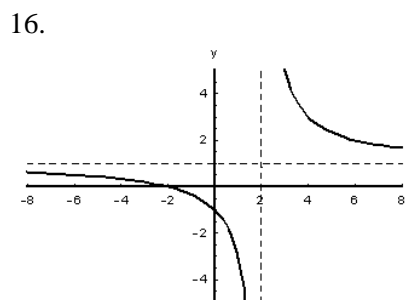
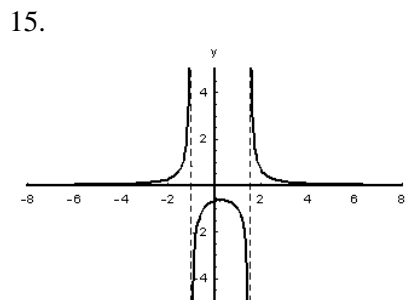
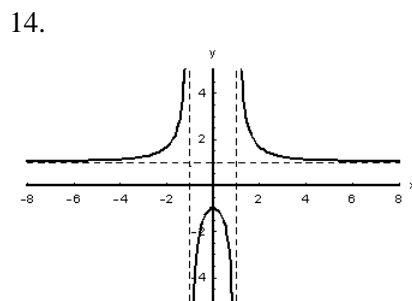
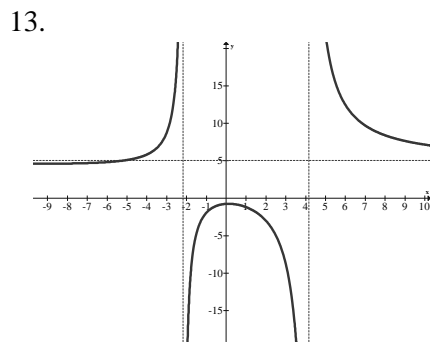
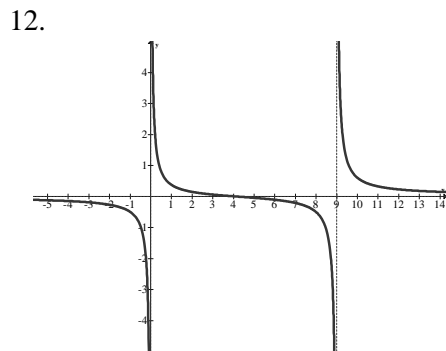
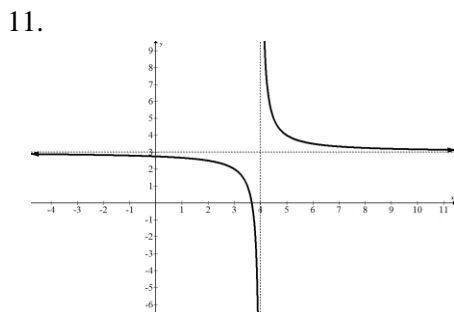
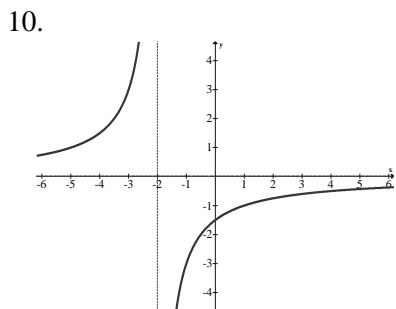
5 $f(x) = \frac{2(x-1)(x+1)}{(x-2)(x+2)}$

6. VA: $x = 2, x = -2$;
HA: $y = 1$

- 7 (a) (1, 0)
(b) (0, 1)
(c) $x = -1, x = 5$
(d) $y = 0$

8. (a) (9, 0)
(b) (0, 9)
(c) $x = -3$
(d) $y = 1$

9. (a) no solution
(b) (0, -3)
(c) $x = -1, x = 3$
(d) $y = 3$



20. $f(x) = \frac{3(x-1)(x+4)}{(x-2)(x+2)}$