

Math 220 Supplementary Exercises -- Chapter 16

Evaluate the limits:

1. $\lim_{x \rightarrow \infty} \frac{7x-5}{3x+2}$

2. $\lim_{x \rightarrow -\infty} \frac{5}{x^2+1}$

3. $\lim_{x \rightarrow \infty} \frac{-2x^5+3x^2+1}{3x^4+6x-10}$

4. $\lim_{x \rightarrow -\infty} \frac{x^2-1}{x+4}$

5. $\lim_{x \rightarrow \infty} \frac{5x-9}{x+4x^3}$

6. $\lim_{x \rightarrow \infty} \frac{\sqrt{x^2+1}}{4-x}$

7. $\lim_{x \rightarrow -\infty} \frac{\sqrt{x^4+1}}{x^3+1}$

8. $\lim_{x \rightarrow \infty} \frac{x^{\frac{4}{3}}+4x^{\frac{1}{3}}}{x^{\frac{4}{3}}-2x}$

9. $\lim_{x \rightarrow 2^+} \frac{5}{2-x}$

10. $\lim_{x \rightarrow 1^-} \frac{3x}{x^2-1}$

11. $\lim_{x \rightarrow 5^+} \frac{x-1}{(5-x)^2}$

12. $\lim_{x \rightarrow 3^-} \frac{2x-6}{x-3}$

13. $\lim_{x \rightarrow 4^+} \frac{(x+2)(x-1)}{(x+3)(x-4)}$

14. $\lim_{x \rightarrow 4^-} \frac{(x+2)(x-1)}{(x+3)(x-4)}$

15. $\lim_{x \rightarrow -2^-} \frac{(x+2)(x-1)}{(x+3)(x-4)}$

16. $\lim_{x \rightarrow -3^-} \frac{(x+2)(x-1)}{(x+3)(x-4)}$

Find the equations of any vertical or horizontal asymptotes:

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

18. $g(x) = \frac{1}{x} + \frac{1}{x-1}$

19. $h(x) = \frac{3x+2}{x^2-6x+8}$

20. $y = \frac{x^2+2x+1}{5x^2+5x}$

Answers:

1. $\frac{7}{3}$ 2. 0 3. $-\infty$ 4. $-\infty$ 5. 0 6.
-1
7. 0 8. ∞ 9. $-\infty$ 10. $-\infty$ 11. ∞ 12. 2
13. ∞ 14. $-\infty$ 15. 0 16. ∞

Vertical Asymp.

Horiz. Asymp.

- | | | |
|-----|----------------|-------------------|
| 17. | $x = 2$ | $y = 4$ |
| 18. | $x = 0, x = 1$ | $y = 0$ |
| 19. | $x = 2, x = 4$ | $y = 0$ |
| 20. | $x = 0$ | $y = \frac{1}{5}$ |