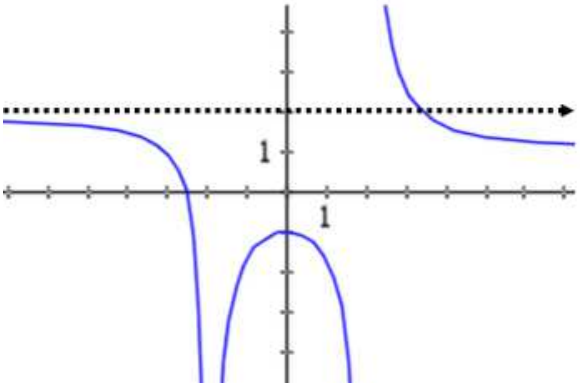
AP Calculus
1.5 ws1 key

Use the following graph for questions #1-12.



1. $\lim_{x\to -2^+} g(x) = -\infty$

2. $\lim_{x\to -2^-} g(x) = -\infty$

3. $\lim_{x\to -2} g(x) = -\infty$

4. $\lim_{x\to 2} g(x) = DNE$

5. $\lim_{x\to 2-} g(x) = -\infty$

6. $\lim_{x\to 2+} g(x) = \infty$

7. $\lim_{x\to 0} g(x) = -1$

8. $\lim_{x\to \infty} g(x) = 1$

9. $\lim_{x\to -\infty} g(x) = 2$

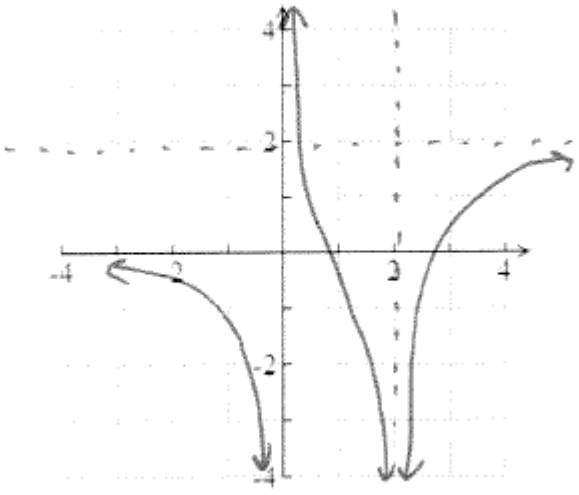
10. Explain why $y = 1$ is a horizontal asymptote to $g(x)$.
    As x approaches infinity, the y values will approach one.

11. Explain why $x = -2$ is a vertical asymptote to $g(x)$.
    As x approaches -2, from either side, the function approaches negative infinity.

12. Is there a vertical asymptote at $x = 2$? Yes

13. Sketch the graph of f that satisfies all of the given conditions.

$\lim_{x\to 2} f(x) = -\infty$
$\lim_{x\to \infty} f(x) = 2$
$\lim_{x\to -\infty} f(x) = 0$
$\lim_{x\to 0^+} f(x) = \infty$
$\lim_{x\to 0^-} f(x) = -\infty$

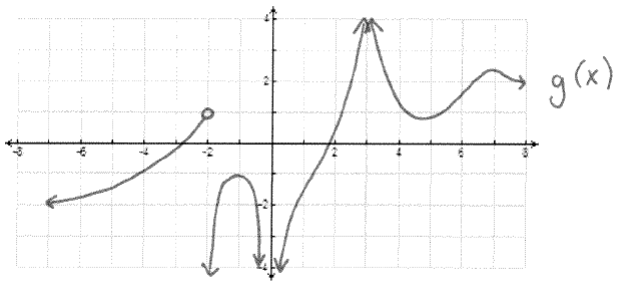


14. Find the following for $g(x)$.

a) $\lim_{x\to\infty} g(x) = 2$ b) $\lim_{x\to-\infty} g(x) = -2$ c) $\lim_{x\to 3} g(x) = \infty$ d) $\lim_{x\to 0} g(x) = -\infty$

e) $\lim_{x\to -2^+} g(x) = -\infty$ f) equations of all asymptotes $x = 3$

$x = 0$
$x = -2$
$y = 2$
$y = -2$



Find each limit using a calculator.

15. $\lim_{x\to 3^+} \frac{x+2}{x+3} = \frac{5}{6}$

16. $\lim_{x\to 1} \frac{2-x}{(x-1)^2} = \infty$

17. $\lim_{x\to\left(\frac{-\pi}{2}\right)^-} \sec x = -\infty$

18. $\lim_{x\to\infty} \frac{x^3+5x}{2x^3-x^2+4} = \frac{1}{2}$

19. $\lim_{x\to\infty} \frac{4x^4+5}{(x^2-2)(2x^2-1)} = 2$

20. $\lim_{x\to\infty} \frac{\sin^2 x}{x^2} = 0$

21. $\lim_{x\to\infty} \tan^{-1}\left(x^4-x^2\right) = \frac{\pi}{2}$

22. $\lim_{x\to\infty} e^{-x^2} = 0$

23. $\lim_{x\to\infty} \left(\sqrt{9x^2+x}-3x\right) = \frac{1}{6}$

24. $\lim_{x\to\infty} \cos x = DNE$

25. $\lim_{x\to\infty} \frac{x^7-1}{x^6+1} = \infty$

26. $\lim_{x\to-\infty} \left(x^3-5x^2\right) = -\infty$

27. $\lim_{x\to 5^-} \frac{e^x}{(x-5)^3} = -\infty$

28. $\lim_{x\to 5^+} \ln(x-5) = -\infty$

29. $\lim_{x\to\infty} \frac{3x+5}{x-4} = 3$

30. $\lim_{x\to-\infty} \frac{x^2+2}{x^3+x^2-1} = 0$

31. $\lim_{x\to\infty} \frac{x+2}{\sqrt{9x^2+1}} = \frac{1}{3}$

32. $176 million, $528 million, and $1584 million. The limit as *x* approaches 100 from the left is infinity. Which, in this problem, means it's basically impossible to seize all of the drugs.