

25. $\frac{\pi}{180}$

24. $A = \frac{\pi}{360} r^2 \theta$

26. $f(x) = \frac{\sin 2x}{x}$

x	± 0.1	± 0.01	± 0.001
$f(x)$	1.987	1.999	1.9999

Conjecture: $\lim_{x \rightarrow 0} f(x) = 2$.

27. $f(x) = \frac{\tan 3x}{x}$

x	± 0.1	± 0.01	± 0.001
$f(x)$	3.0934	3.0009	3.0000

Conjecture: $\lim_{x \rightarrow 0} f(x) = 3$.

28. $f(x) = \frac{\cos x - 1}{x}$

x	± 0.1	± 0.01	± 0.001
$f(x)$	∓ 0.04996	∓ 0.00500	∓ 0.00050

Conjecture: $\lim_{x \rightarrow 0} f(x) = 0$.

29. $f(x) = \frac{x - \sin x}{x^2}$

x	-0.01	0.01	-0.001	0.001
$f(x)$	-0.00167	0.00167	-0.00017	0.00017

Conjecture: $\lim_{x \rightarrow 0} f(x) = 0$.

2.4 LIMITS INVOLVING INFINITY

1. a) $\frac{2}{5}$ b) $\frac{2}{5}$

2. a) 2 b) 2

3. a) 0 b) 0

4. a) 0 b) 0

5. a) ∞ b) $-\infty$

6. a) ∞ b) $-\infty$

7. a) 0 b) 0

8. a) 0 b) 0

9. a) $-\frac{2}{3}$ b) $-\frac{2}{3}$

10. a) -1 b) -1

11. a) -1 b) -1

12. a) 5 b) 5

13. ∞

14. $-\infty$

15. ∞

16. $-\infty$

17. ∞

18. $-\infty$

19. $-\infty$

20. ∞

21. $y = 0$ is the end behavior asymptote. Vertical asymptotes at $x = -\frac{5}{2}$ and $x = 1$.22. EBA: $T = 0$. Vertical asymptotes at $y = \pm 2$ in the (y, T) -plane.23. EBA: $y = 3$; VA: $x = \pm 2$ 24. EBA: $y = \frac{1}{2}$; VA: $x = \frac{1 \pm \sqrt{31}}{6}$ 25. EBA: $y = x - 4$; VA: $x = -2$ 26. EBA: $y = x - 6$; VA: $x = -3$

27. EBA: $y = x^2 + 2x + 2$; VA: $x = 2$ 28. EBA: $y = x^2 + 2$; VA: $x = \pm 2$
29. EBA: $y = 1$; VA: $x = \frac{1 \pm \sqrt{5}}{2}$ 30. EBA: $y = x - 1$; VA: $x = -1, 1, 2$
31. a) ∞ b) $-\infty$ c) $-\infty$ d) ∞
32. a) ∞ b) $-\infty$ c) ∞ d) $-\infty$
33. a) ∞ b) $-\infty$ 34. a) ∞ b) $-\infty$ 35. 0 36. ∞
37. 1 38. -1 39. ∞ 40. $-\infty$ 41. $-\infty$ 42. ∞
43. 0, $-\infty$, -1, -1, respectively 44. 1, 2, ∞ , 0, respectively
45. 2 46. 0 47. 2 48. 1 49. 0 50. 1
51. Both limits are equal to 2. 52. 1
53. Each graph satisfies $y \rightarrow \infty$ as $x \rightarrow \infty$ and $y \rightarrow -\infty$ as $x \rightarrow -\infty$. As the power of x increases, the vertical steepness of the graph increases for $|x| > 1$.
54. Each graph satisfies $y \rightarrow -\infty$ as $x \rightarrow \pm\infty$. For $|x| > 1$, the vertical steepness of the graph increases as the power of x increases.
55. Carrying out the hint proves that $y = -\frac{1}{7}$ is an end behavior model for $f(x)$ by definition of end behavior model.
57. One such function is $f(x) = \begin{cases} x + 1, & x \leq 2 \\ \frac{1}{5-x}, & 2 < x < 5 \\ -1, & x \geq 5 \end{cases}$. Graph $y_1 = x + 1 + 0\sqrt{2-x}$, $y_2 = \frac{1}{5-x} + 0\sqrt{x-2} + 0\sqrt{5-x}$ and $y_3 = -1 + 0\sqrt{x-5}$ in $[-5, 10]$ by $[-10, 10]$.
58. One such function is $f(x) = \begin{cases} 2 - \frac{15}{x^2+1}, & x \leq 4 \\ x + \frac{1}{4-x}, & x > 4 \end{cases}$. Graph $y_1 = 2 - \frac{15}{x^2+1} + 0\sqrt{4-x}$, and $y_2 = x + \frac{1}{4-x} + 0\sqrt{x-4}$ in $[-10, 9]$ by $[-20, 20]$.