

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

38. $f(x) = \pi - \frac{2}{x^2}$

39. $g(x) = \frac{1}{2 + (1/x)}$

40. $g(x) = \frac{1}{8 - (5/x^2)}$

41. $h(x) = \frac{-5 + (7/x)}{3 - (1/x^2)}$

42. $h(x) = \frac{3 - (2/x)}{4 + (\sqrt{2}/x^2)}$

43. $\lim_{x \rightarrow \infty} \frac{\sin 2x}{x}$

44. $\lim_{\theta \rightarrow -\infty} \frac{\cos \theta}{3\theta}$

45. $\lim_{t \rightarrow -\infty} \frac{2 - t + \sin t}{t + \cos t}$

46. $\lim_{r \rightarrow \infty} \frac{r + \sin r}{2r + 7 - 5 \sin r}$

The following limits as $x \rightarrow \infty$ and $x \rightarrow -\infty$

47. $f(x) = \frac{2x + 3}{5x + 7}$

48. $f(x) = \frac{2x^3 + 7}{x^3 - x^2 + x + 7}$

49. $f(x) = \frac{x + 1}{x^2 + 3}$

50. $f(x) = \frac{3x + 7}{x^2 - 2}$

51. $h(x) = \frac{7x^3}{x^3 - 3x^2 + 6x}$

52. $g(x) = \frac{1}{x^3 - 4x + 1}$

53. $g(x) = \frac{10x^5 + x^4 + 31}{x^6}$

54. $h(x) = \frac{9x^4 + x}{2x^4 + 5x^2 - x + 6}$

55. $h(x) = \frac{-2x^3 - 2x + 3}{3x^3 + 3x^2 - 5x}$

56. $h(x) = \frac{-x^4}{x^4 - 7x^3 + 7x^2 + 9}$

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

59. $\lim_{x \rightarrow -\infty} \frac{\sqrt[3]{x} - \sqrt[5]{x}}{\sqrt[3]{x} + \sqrt[5]{x}}$

61. $\lim_{x \rightarrow \infty} \frac{2x^{5/3} - x^{1/3} + 7}{x^{8/5} + 3x + \sqrt{x}}$

58. $\lim_{x \rightarrow \infty} \frac{2 + \sqrt{x}}{2 - \sqrt{x}}$

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

62. $\lim_{x \rightarrow -\infty} \frac{\sqrt[3]{x} - 5x + 3}{2x + x^{2/3} - 4}$

Trigonometric Identities

1) $csc x = \frac{1}{sin x}$

2) $sec x = \frac{1}{cos x}$

3) $cot x = \frac{1}{tan x}$

4) $sin^2 x + cos^2 x = 1$

5) $tan^2 x + 1 = sec^2 x$

6) $1 + cot^2 x = csc^2 x$

7) $sin(-x) = -sin(x)$ that is $sin(x)$ is odd

8) $cos(-x) = cos(x)$ that is $cos(x)$ is even

9) $tan(-x) = -tan(x)$ that is $tan(x)$ is odd

10) $sin(x \pm y) = sin x cos y \pm cos x sin y$

11) $cos(x \pm y) = cos x cos y \mp sin x sin y$

12) $tan(x \pm y) = \frac{tan x \pm tan y}{1 \mp tan x tan y}$

13) $sin(2x) = 2sin(x)cos(x)$

14) $cos(2x) = cos^2 x - sin^2 x = 1 - 2 sin^2(x)$
 $= 2 cos^2(x) - 1$

15) $tan 2x = \frac{2tan x}{1 - tan^2 x}$

16) $sin^2 x = \frac{1 - cos 2x}{2}$

17) $cos^2 x = \frac{1 + cos 2x}{2}$

18) $tan^2 x = \frac{1 - cos 2x}{1 + cos 2x}$

EXERCISES 2.5 P. 122

1. $\lim_{x \rightarrow 0^+} \frac{1}{3x}$

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

5. $\lim_{x \rightarrow -8^+} \frac{2x}{x + 8}$

7. $\lim_{x \rightarrow 7} \frac{4}{(x - 7)^2}$

9. a. $\lim_{x \rightarrow 0^+} \frac{2}{3x^{1/3}}$

10. a. $\lim_{x \rightarrow 0^+} \frac{2}{x^{1/5}}$

11. $\lim_{x \rightarrow 0} \frac{4}{x^{2/5}}$

13. $\lim_{x \rightarrow (\pi/2)^-} \tan x$

15. $\lim_{\theta \rightarrow 0^-} (1 + \csc \theta)$

2. $\lim_{x \rightarrow 0^-} \frac{5}{2x}$

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

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

8. $\lim_{x \rightarrow 0} \frac{-1}{x^2(x + 1)}$

b. $\lim_{x \rightarrow 0^-} \frac{2}{3x^{1/3}}$

b. $\lim_{x \rightarrow 0^-} \frac{2}{x^{1/5}}$

12. $\lim_{x \rightarrow 0} \frac{1}{x^{2/3}}$

14. $\lim_{x \rightarrow (-\pi/2)^+} \sec x$

16. $\lim_{\theta \rightarrow 0} (2 - \cot \theta)$