Keeper 2.2 – Algebraic Limits

Examples: Finding Limits Algebraically

Given:

$$\lim_{x \to a} f(x) = -3 \qquad \lim_{x \to a} g(x) = 0 \qquad \lim_{x \to a} h(x) = 8$$

Find:

1. $\lim\limits_{x \to a} \dfrac{1}{f(x)}$

2. $\lim\limits_{x \to a} \dfrac{h(x)}{g(x)}$

3. $\lim\limits_{x \to a} \dfrac{2f(x)}{h(x) - f(x)}$

Examples: Evaluate the Limit

4. $\lim\limits_{x \to 3}(5x - 6)$

5. $\lim\limits_{x \to -2} \sqrt{3x - 2}$

6. $\lim\limits_{x \to \frac{2}{3}} \dfrac{3x - 2}{4 - 9x^2}$

7. $\lim\limits_{x \to 25} \dfrac{\sqrt{x} - 5}{25 - x}$

8. $\lim\limits_{x \to \frac{1}{2}} \dfrac{6x^2 + 7x - 5}{8x^2 - 4x}$

9. $\lim\limits_{x \to \frac{3}{2}} \dfrac{2x - 3}{8x^3 - 27}$

10.
$$\lim_{x \to 3} \frac{\sqrt{x^2 + 16} - 5}{x - 3}$$

11.
$$\lim_{x \to 10} \frac{\frac{x}{5} - 2}{x - 10}$$

12.
$$\lim_{x \to 27} \frac{x - 27}{\sqrt[3]{x} - 3}$$

13.
$$\lim_{x \to 1} \frac{(4x^4 - 5x^2 + 1)}{x^2 + 2x - 3}$$

14.
$$\lim_{x \to 0} \frac{\frac{3}{x + 5} - \frac{3}{5}}{x}$$

15.
$$\lim_{x \to 1} \frac{x^2 - 2x - 15}{x - 5}$$

16.
$$\lim_{x \to 2} \frac{(2x + 1)^2 - 25}{x - 2}$$

17.
$$\lim_{h \to 0} \frac{(x + h)^2 - x^2}{h}$$

18. $\displaystyle\lim_{x\to-\infty} e^{x}$

19. $\displaystyle\lim_{x\to 0} e^{|x|}$

20. $\displaystyle\lim_{x\to-\infty} e^{|x|}$

21. $\displaystyle\lim_{x\to-\infty} \ln x$

22. $\displaystyle\lim_{x\to\infty} \ln x$

23. $\displaystyle\lim_{x\to\infty} \ln |x|$

24. $\displaystyle\lim_{x\to-\infty} \ln |x|$

25. $\displaystyle\lim_{x\to 0^{+}} |\ln x|$