

Section 2-5 : Computing Limits

For problems 1 – 9 evaluate the limit, if it exists.

1. $\lim_{x \rightarrow 2} (8 - 3x + 12x^2)$

2. $\lim_{t \rightarrow -3} \frac{6 + 4t}{t^2 + 1}$

3. $\lim_{x \rightarrow -5} \frac{x^2 - 25}{x^2 + 2x - 15}$

4. $\lim_{z \rightarrow 8} \frac{2z^2 - 17z + 8}{8 - z}$

5. $\lim_{y \rightarrow 7} \frac{y^2 - 4y - 21}{3y^2 - 17y - 28}$

6. $\lim_{h \rightarrow 0} \frac{(6+h)^2 - 36}{h}$

7. $\lim_{z \rightarrow 4} \frac{\sqrt{z} - 2}{z - 4}$

8. $\lim_{x \rightarrow -3} \frac{\sqrt{2x + 22} - 4}{x + 3}$

9. $\lim_{x \rightarrow 0} \frac{x}{3 - \sqrt{x+9}}$

10. Given the function

$$f(x) = \begin{cases} 7 - 4x & x < 1 \\ x^2 + 2 & x \geq 1 \end{cases}$$

Evaluate the following limits, if they exist.

(a) $\lim_{x \rightarrow -6} f(x)$

(b) $\lim_{x \rightarrow 1} f(x)$

11. Given

$$h(z) = \begin{cases} 6z & z \leq -4 \\ 1-9z & z > -4 \end{cases}$$

Evaluate the following limits, if they exist.

(a) $\lim_{z \rightarrow 7} h(z)$

(b) $\lim_{z \rightarrow -4} h(z)$

For problems 12 & 13 evaluate the limit, if it exists.

12. $\lim_{x \rightarrow 5} (10 + |x - 5|)$

13. $\lim_{t \rightarrow -1} \frac{t+1}{|t+1|}$

14. Given that $7x \leq f(x) \leq 3x^2 + 2$ for all x determine the value of $\lim_{x \rightarrow 2} f(x)$.

15. Use the Squeeze Theorem to determine the value of $\lim_{x \rightarrow 0} x^4 \sin\left(\frac{\pi}{x}\right)$.

