

Compute the limit and use the ϵ - δ definition of limit to prove your answer is correct.

1. $\lim_{x \rightarrow 2} (3x - 7)$

2. $\lim_{x \rightarrow 5} (-x + 4)$

3. $\lim_{x \rightarrow 200} \left(\frac{x}{20} - 37 \right)$

4. $\lim_{x \rightarrow 4} 3$

5. $\lim_{x \rightarrow 5} 13$

6. $\lim_{x \rightarrow 2} (4x^2 + 3x - 5)$

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

8. $\lim_{x \rightarrow 10} (x^3 + 3x)$

9. $\lim_{x \rightarrow 1} (x^4 + 2x)$

10. $\lim_{x \rightarrow 0} (x^5 - 3)$

11. $\lim_{t \rightarrow 1} (t^5 + 3t - 1)$

12. $\lim_{x \rightarrow 5} (x^2 + 3)$

13. $\lim_{x \rightarrow 3} \frac{3x - 1}{x^2 - 1}$

14. $\lim_{x \rightarrow -2} \frac{x^2 - 1}{2x - 3}$

15. $\lim_{t \rightarrow 5} \frac{t - 1}{t + 1}$

16. $\lim_{y \rightarrow -1} \frac{2y^2 - 3y + 1}{y^2 - 3y + 4}$

17. $\lim_{p \rightarrow 0} \frac{3p^3 - 2p + 8}{2p + 4}$

18. $\lim_{r \rightarrow -3} \frac{2r + 3}{r - 1}$

19. $\lim_{x \rightarrow 1} \sqrt{x + 3}$

20. $\lim_{t \rightarrow 2} \frac{1}{\sqrt[4]{15 + t}}$

21. $\lim_{x \rightarrow 4} \frac{x}{\sqrt{x + 5}}$

22. $\lim_{x \rightarrow -2} \frac{x^2 + 1}{\sqrt[5]{x + 3}}$

Prove the limits are not the indicated numbers.

23. $\lim_{x \rightarrow 2} (x^2 + 3x + 4) \neq 10$

24. $\lim_{x \rightarrow 0} \frac{|x|}{x} \neq 1$

25. $\lim_{x \rightarrow 4} \frac{1}{x - 4} \neq 0$

26. $\lim_{x \rightarrow 3} \frac{x^2 + 3x - 18}{x^2 - 9} \neq 4$

Does the limit exist? If so, give the limit and prove your answer is correct. If not, state (without proof) how you know the limit does not exist.

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

28. $\lim_{x \rightarrow 5} (-x^2 + 4)$

29. $\lim_{x \rightarrow 3} \frac{|x - 3|}{x - 3}$

30.
$$\lim_{x \rightarrow 4} \frac{x - 4}{|x - 4|}$$

31.
$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$$

32.
$$\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4}$$

33.
$$\lim_{x \rightarrow -1} \frac{x^3 + 1}{x + 1}$$

34.
$$\lim_{x \rightarrow -1} \frac{x^3 - 1}{x + 1}$$

Compute the limit and use the $\epsilon - \delta$ definition to prove the limit is what you say it is.

35.
$$\lim_{x \rightarrow 10^+} (x^2 - 1)$$

36.
$$\lim_{x \rightarrow 1^+} \sqrt{x - 1}$$

37.
$$\lim_{x \rightarrow 2^-} \frac{|x - 2|}{x - 2}$$

38.
$$\lim_{x \rightarrow 2^+} \frac{|x - 2|}{x - 2}$$

39.
$$\lim_{x \rightarrow -1^+} \frac{x^2 + 1}{|x - 1|}$$

40.
$$\lim_{x \rightarrow -1^-} \frac{x^2 + 1}{|x - 1|}$$