

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

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

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

3.
$$\lim_{t \rightarrow 5} \frac{t - 1}{t + 1}$$

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

5.
$$\lim_{p \rightarrow 0} \frac{3p^3 - 2p + 8}{2p + 4}$$

6.
$$\lim_{r \rightarrow -3} \frac{2r + 3}{r - 1}$$

Does the limit exist? If so, give the limit and prove your answer is correct. If not, prove it does not exist. (In either case, use the definition of limit to do the proof.)

7.
$$\lim_{x \rightarrow 0} \frac{-2}{x}$$

8.
$$\lim_{x \rightarrow 5} (-x^2 + 4)$$

9.
$$\lim_{x \rightarrow 3} \frac{|x - 3|}{x - 3}$$

10.
$$\lim_{x \rightarrow 4} \frac{x - 4}{|x - 4|}$$

11.
$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1}$$

12.
$$\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{x - 4}$$

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

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

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

15.
$$\lim_{x \rightarrow 10^+} (x^2 - 1)$$

16.
$$\lim_{x \rightarrow 1^+} \sqrt{x - 1}$$

17.
$$\lim_{x \rightarrow 2^-} \frac{|x - 2|}{x - 2}$$

18.
$$\lim_{x \rightarrow 2^+} \frac{|x - 2|}{x - 2}$$

19.
$$\lim_{x \rightarrow -1^+} \frac{x^2 + 1}{|x - 1|}$$

20.
$$\lim_{x \rightarrow -1^-} \frac{x^2 + 1}{|x - 1|}$$