

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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