Evaluating Limits Algebraically … and without a calculator

Evaluate each limit algebraically. No calculator.

1. $\lim_{x\to 0}(3x+5)$

2. $\lim_{x\to 5}(2-3x)$

3. $\lim_{x\to 8}(8-x)$

4. $\lim_{x\to 3}\frac{x+2}{x}$

5. $\lim_{x\to 0}\frac{x+2}{x}$

6. $\lim_{x\to 4}\frac{x^2-16}{x-4}$

7. $\lim_{x\to 2}\frac{x^3-8}{2-x}$

8. $\lim_{x\to 2}\frac{x^2+2x-8}{x-2}$

9. $\lim_{x\to 4}\frac{2x^2-5x-12}{x-4}$

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10. $\lim_{x\to -5} \dfrac{x+5}{x^3+125}$

11. $\lim_{x\to 3} \dfrac{x^3-3x^2-4x+12}{x-3}$

12. $\lim_{x\to 2} \dfrac{x^3-2x^2+3x-6}{x^2-4}$

13. $\lim_{x\to 3} \dfrac{x-3}{\frac{1}{x}-\frac{1}{3}}$

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14. $\lim_{x\to 0} \dfrac{\frac{1}{x+4} - \frac{1}{4}}{x}$

15. $\lim_{x\to 9} \dfrac{\sqrt{x}-3}{x-9}$

16. $\lim_{x\to 0} \dfrac{x}{\sqrt{x+4}-2}$

17. $\lim_{x\to 1} \dfrac{x^2-\sqrt{x}}{x^4-1}$

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Evaluate each limit and then identify any horizontal asymptotes.

18. $\lim_{x\to\infty} \dfrac{x^3+8x-4}{2x^3+3}$

19. $\lim_{x\to\infty} \dfrac{x^2-1}{2x^3-8x^2+3}$

20. $\lim_{x\to\infty} \dfrac{x^5-x-1}{6x^3}$

21. $\lim_{x\to\infty} \dfrac{x+1}{x^2-1}$

22. $\lim_{x\to\infty} \dfrac{x^2-1}{x+1}$

Evaluate each limit and then identify any vertical asymptotes.

23. $\lim_{x\to 2} \dfrac{5x^2+x}{x-2}$

24. $\lim_{x\to 1} \dfrac{x}{(x-1)^3}$

25. $\lim_{x\to -3} \dfrac{x^2+2x-15}{x^2-9}$

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Answers

1) 5	6) 8	11) 5	16) 4	21) 0 , $y = 0$
2) -13	7) -12	12) 7/4	17) 3/8	21) und, no HA
3) 0	8) 6	13) -9	18) ½ , $y = 1/2$	23) und, $x = 2$
4) 5/3	9) 11	14) -1/16	19) 0 , $y = 0$	24) und, $x = 1$
5) undefined	10) 1/75	15) 1/6	20) und, no HA	25) und, $x = 3$