

# Exploring Limits ... Set 3

No calculator is allowed. Evaluate each limit algebraically.

1.  $\lim_{x \rightarrow 0} 3x + 5$

2.  $\lim_{x \rightarrow 5} 2 - 3x$

3.  $\lim_{x \rightarrow 8} 8 - x$

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

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

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

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

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

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

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$$10. \lim_{x \rightarrow -5} \frac{x+5}{x^3+125}$$

$$11. \lim_{x \rightarrow 3} \frac{x^3 - 3x^2 - 4x + 12}{x - 3}$$

$$12. \lim_{x \rightarrow 2} \frac{x^3 - 2x^2 + 3x - 6}{x^2 - 4}$$

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

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

$$15. \lim_{x \rightarrow 9} \frac{\sqrt{x} - 3}{x - 9}$$

$$16. \lim_{x \rightarrow 0} \frac{x}{\sqrt{x+4} - 2}$$

$$17. \lim_{x \rightarrow 1} \frac{x^2 - \sqrt{x}}{x^4 - 1}$$

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Evaluate each limit and then identify any horizontal asymptotes.

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

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

$$20. \lim_{x \rightarrow \infty} \frac{x^5 - x - 1}{6x^3}$$

$$21. \lim_{x \rightarrow \infty} \frac{x + 1}{x^2 - 1}$$

$$22. \lim_{x \rightarrow \infty} \frac{x^2 - 1}{x + 1}$$

Evaluate each limit and then identify any vertical asymptotes.

$$23. \lim_{x \rightarrow 2} \frac{5x^2 + x}{x - 2}$$

$$24. \lim_{x \rightarrow 1} \frac{x}{(x - 1)^3}$$

$$25. \lim_{x \rightarrow -3} \frac{x^2 + 2x - 15}{x^2 - 9}$$

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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) $\frac{1}{2}$ , $y = 1/2$	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, $x = 3$