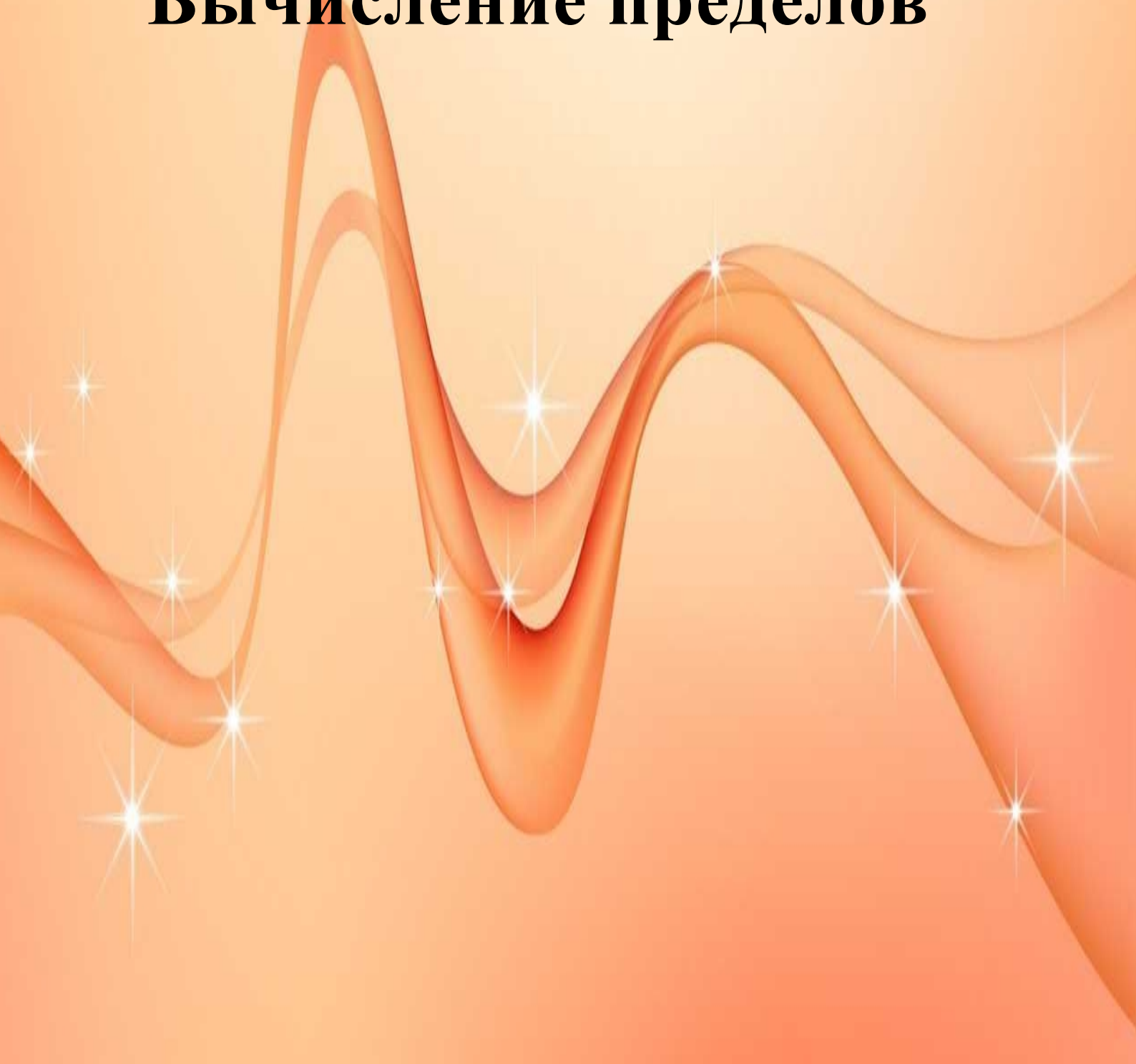


Практическая работа "Вычисление пределов"



Практическая работа по теме: «Вычисление пределов»

$$1.1. \lim_{x \rightarrow 2} \frac{x^2 - 5x + 6}{x^2 - 12x + 20}.$$

$$1.3. \lim_{x \rightarrow 3} \frac{6 + x - x^2}{x^3 - 27}.$$

$$1.5. \lim_{x \rightarrow 2} \frac{2x^2 - 7x + 4}{x^2 - 5x + 6}.$$

$$1.7. \lim_{x \rightarrow 1/3} \frac{3x^2 + 2x - 1}{27x^3 - 1}.$$

$$1.9. \lim_{x \rightarrow -1} \frac{3x^2 + 2x - 1}{-x^2 + x + 2}.$$

$$1.11. \lim_{x \rightarrow 2} \frac{x^3 - 8}{x^2 + x - 6}.$$

$$1.13. \lim_{x \rightarrow 4} \frac{x^2 - 16}{x^2 + x - 20}.$$

$$1.15. \lim_{x \rightarrow 3} \frac{3x^2 - 7x - 6}{2x^2 - 7x + 3}.$$

$$1.17. \lim_{x \rightarrow -1} \frac{5x^2 + 4x - 1}{3x^2 + x - 2}.$$

$$1.19. \lim_{x \rightarrow -1} \frac{7x^2 + 4x - 3}{2x^2 + 3x + 1}.$$

$$1.21. \lim_{x \rightarrow 2} \frac{2x^2 - 9x + 10}{x^2 + 3x - 10}.$$

$$1.23. \lim_{x \rightarrow 2} \frac{-5x^2 + 11x - 2}{3x^2 - x - 10}.$$

$$1.25. \lim_{x \rightarrow 5} \frac{3x^2 - 6x - 45}{2x^2 - 3x - 35}.$$

$$1.27. \lim_{x \rightarrow -5} \frac{x^2 - 2x - 35}{2x^2 + 11x + 5}.$$

$$1.2. \lim_{x \rightarrow 0} \frac{x^3 - x^2 + 2x}{x^2 + x}.$$

$$1.4. \lim_{x \rightarrow 1} \frac{2x^2 - x - 1}{3x^2 - x - 2}.$$

$$1.6. \lim_{x \rightarrow 3} \frac{12 + x - x^2}{x^3 - 27}.$$

$$1.8. \lim_{x \rightarrow -1} \frac{x^2 - 4x - 5}{x^2 - 2x - 3}.$$

$$1.10. \lim_{x \rightarrow 3} \frac{3x^2 - 11x + 6}{2x^2 - 5x - 3}.$$

$$1.12. \lim_{x \rightarrow -1} \frac{x^2 - x - 2}{x^3 + 1}.$$

$$1.14. \lim_{x \rightarrow -3} \frac{4x^2 + 11x - 3}{x^2 + 2x - 3}.$$

$$1.16. \lim_{x \rightarrow -2} \frac{4x^2 + 7x - 2}{3x^2 + 8x + 4}.$$

$$1.18. \lim_{x \rightarrow -1} \frac{x^2 - 4x - 5}{3x^2 + 2x - 2}.$$

$$1.20. \lim_{x \rightarrow 4} \frac{3x^2 - 3x + 2}{x^2 - x - 12}.$$

$$1.22. \lim_{x \rightarrow 1} \frac{4x^2 + x - 5}{x^2 - 2x + 1}.$$

$$1.24. \lim_{x \rightarrow 7} \frac{x^2 - 5x - 14}{2x^2 - 9x - 35}.$$

$$1.26. \lim_{x \rightarrow -3} \frac{4x^2 + 3x + 15}{x^2 - 6x - 27}.$$

$$1.28. \lim_{x \rightarrow -8} \frac{2x^2 + 15x - 8}{3x^2 + 25x + 8}.$$

$$1.29. \lim_{x \rightarrow 4} \frac{3x^2 - 2x - 40}{x^2 - 3x - 4}.$$

$$1.30. \lim_{x \rightarrow -3} \frac{2x^2 + 5x - 3}{3x^2 + 10x + 3}.$$

2

$$2.1. \lim_{x \rightarrow -3} \frac{2x^2 + 11x + 15}{3x^2 + 5x - 12}.$$

$$2.3. \lim_{x \rightarrow 1} \frac{x^3 - 3x + 2}{x^2 - 4x + 3}.$$

$$2.5. \lim_{x \rightarrow -1} \frac{x^4 - x^2 + x + 1}{x^4 + 1}.$$

$$2.7. \lim_{x \rightarrow 2} \frac{x^2 - x + 3}{5x^2 + 3x - 3}.$$

$$2.9. \lim_{x \rightarrow -1} \frac{x^2 - 1}{x^2 + 3x + 2}.$$

$$2.11. \lim_{x \rightarrow -5} \frac{4x^2 + 19x - 5}{2x^2 + 11x + 5}.$$

$$2.13. \lim_{x \rightarrow 1} \frac{x^2 - 2x + 1}{2x^2 - 7x + 5}.$$

$$2.15. \lim_{x \rightarrow -2} \frac{9x^2 + 17x - 2}{x^2 + 2x}.$$

$$2.17. \lim_{x \rightarrow 0} \frac{4x^3 - 2x^2 + 5x}{3x^2 + 7x}.$$

$$2.19. \lim_{x \rightarrow 3} \frac{3x^2 + 5x - 1}{x^2 - 5x + 6}.$$

$$2.21. \lim_{x \rightarrow 4} \frac{x^2 + 3x - 28}{x^3 - 64}.$$

$$2.23. \lim_{x \rightarrow 4} \frac{x^2 + 3x - 28}{x^2 - 4x}.$$

$$2.2. \lim_{x \rightarrow 1} \frac{2x^2 + 5x - 10}{x^3 - 1}.$$

$$2.4. \lim_{x \rightarrow 2} \frac{3x^2 + 2x + 1}{x^3 - 8}.$$

$$2.6. \lim_{x \rightarrow 1} \frac{2x^2 - 3x - 1}{x^4 - 1}.$$

$$2.8. \lim_{x \rightarrow -2} \frac{x^2 + 2x}{x^2 + 4x + 4}.$$

$$2.10. \lim_{x \rightarrow -4} \frac{2x^2 + 7x - 4}{x^3 + 64}.$$

$$2.12. \lim_{x \rightarrow 1} \frac{x^3 - x^2 + x - 1}{x^3 + x - 2}.$$

$$2.14. \lim_{x \rightarrow 2} \frac{x^3 - 8}{2x^2 - 9x + 10}.$$

$$2.16. \lim_{x \rightarrow 1} \frac{x^3 + x - 2}{x^3 - x^2 - x + 1}.$$

$$2.18. \lim_{x \rightarrow 1} \frac{4x^4 - 5x^2 + 1}{x^2 - 1}.$$

$$2.20. \lim_{x \rightarrow -5} \frac{x^2 - x - 30}{x^3 + 125}.$$

$$2.22. \lim_{x \rightarrow 1/2} \frac{8x^3 - 1}{x^2 - 1/4}.$$

$$2.24. \lim_{x \rightarrow -2} \frac{3x^2 + 11x + 10}{x^2 - 5x + 14}.$$

$$2.25. \lim_{x \rightarrow -2} \frac{x^2 - 4}{3x^2 + x - 10}.$$

$$2.27. \lim_{x \rightarrow 6} \frac{2x^2 - 11x - 6}{3x^2 - 20x + 12}.$$

$$2.29. \lim_{x \rightarrow 2} \frac{x^3 - 2x - 4}{x^2 - 11x + 18}.$$

$$2.26. \lim_{x \rightarrow 0} \frac{3x^2 + x}{4x^2 - 5x + 1}.$$

$$2.28. \lim_{x \rightarrow -6} \frac{x^2 + 2x - 24}{2x^3 + 15x + 18}.$$

$$2.30. \lim_{x \rightarrow 4} \frac{x^3 - 64}{7x^2 - 27x - 4}.$$

3

$$3.1. \lim_{x \rightarrow \infty} \frac{3x^3 - 5x^2 + 2}{2x^3 + 5x^2 - x}.$$

$$3.3. \lim_{x \rightarrow \infty} \frac{5x^4 - 3x^2 + 7}{x^4 + 2x^3 + 1}.$$

$$3.5. \lim_{x \rightarrow \infty} \frac{x^3 - 4x^2 + 28x}{5x^3 + 3x^2 + x - 1}.$$

$$3.7. \lim_{x \rightarrow \infty} \frac{-3x^4 + x^2 + x}{x^4 + 3x - 2}.$$

$$3.9. \lim_{x \rightarrow \infty} \frac{-x^2 + 3x + 1}{3x^2 + x - 5}.$$

$$3.11. \lim_{x \rightarrow \infty} \frac{4x^2 + 5x - 7}{2x^2 - x + 10}.$$

$$3.13. \lim_{x \rightarrow \infty} \frac{3x^2 + 2x + 9}{2x^2 - x + 4}.$$

$$3.15. \lim_{x \rightarrow \infty} \frac{2x^3 + 7x - 2}{3x^3 - x - 4}.$$

$$3.17. \lim_{x \rightarrow \infty} \frac{3x^4 - 6x^2 + 2}{x^4 + 4x - 3}.$$

$$3.19. \lim_{x \rightarrow \infty} \frac{8x^4 - 4x^2 + 3}{2x^4 + 1}.$$

$$3.21. \lim_{x \rightarrow \infty} \frac{7x^3 + 4x}{x^3 - 3x + 2}.$$

$$3.23. \lim_{x \rightarrow \infty} \frac{2x^3 + 7x^2 - 2}{6x^3 - 4x + 3}.$$

$$3.25. \lim_{x \rightarrow \infty} \frac{x - 2x^2 + 5x^4}{2 + 3x^2 + x^4}.$$

$$3.27. \lim_{x \rightarrow \infty} \frac{4 - 5x^2 - 3x^5}{x^5 + 6x + 8}.$$

$$3.29. \lim_{x \rightarrow \infty} \frac{4x^3 - 2x + 1}{2x^3 + 3x^2 + 2}.$$

$$3.2. \lim_{x \rightarrow \infty} \frac{4x^3 + 7x}{2x^3 - 4x^2 + 5}.$$

$$3.4. \lim_{x \rightarrow \infty} \frac{7x^3 - 2x^2 + 4x}{2x^3 + 5}.$$

$$3.6. \lim_{x \rightarrow \infty} \frac{3x^2 + 10x + 3}{2x^2 + 5x - 3}.$$

$$3.8. \lim_{x \rightarrow \infty} \frac{2x^2 + 7x + 3}{5x^2 - 3x + 4}.$$

$$3.10. \lim_{x \rightarrow \infty} \frac{x^3 - 3x^2 + 10}{7x^3 + 2x + 1}.$$

$$3.12. \lim_{x \rightarrow \infty} \frac{3x^4 + 2x + 1}{x^4 - x^3 + 2x}.$$

$$3.14. \lim_{x \rightarrow \infty} \frac{3x^2 + 5x - 7}{3x^2 + x + 1}.$$

$$3.16. \lim_{x \rightarrow 0} \frac{18x^2 + 5x}{8 - 3x - 9x^2}.$$

$$3.18. \lim_{x \rightarrow \infty} \frac{8x^2 + 4x - 5}{4x^2 - 3x + 2}.$$

$$3.20. \lim_{x \rightarrow \infty} \frac{3x^2 - 4x + 2}{6x^2 + 5x + 1}.$$

$$3.22. \lim_{x \rightarrow \infty} \frac{1 + 4x - x^4}{x + 3x^2 + 2x^4}.$$

$$3.24. \lim_{x \rightarrow \infty} \frac{3x + 14x^2}{1 + 2x + 7x^2}.$$

$$3.26. \lim_{x \rightarrow \infty} \frac{3x^4 - 2x^2 - 7}{3x^4 + 3x + 5}.$$

$$3.28. \lim_{x \rightarrow \infty} \frac{5x^3 - 7x^2 + 3}{2 + 2x - x^3}.$$

$$3.30. \lim_{x \rightarrow \infty} \frac{5x^2 - 3x + 1}{3x^2 + x - 5}.$$

4

$$4.1. \lim_{x \rightarrow -\infty} \frac{x^5 - 2x + 4}{2x^4 + 3x^2 + 1}.$$

$$4.3. \lim_{x \rightarrow -\infty} \frac{3x^2 + 7x - 4}{x^5 + 2x - 1}.$$

$$4.5. \lim_{x \rightarrow \infty} \frac{2x^3 + 7x - 1}{3x^4 + 2x + 5}.$$

$$4.7. \lim_{x \rightarrow -\infty} \frac{3x^6 - 5x^2 + 2}{2x^3 + 4x - 5}.$$

$$4.9. \lim_{x \rightarrow -\infty} \frac{7x^2 + 5x + 9}{1 + 4x - x^3}.$$

$$4.11. \lim_{x \rightarrow -\infty} \frac{2x^2 + 5x + 7}{3x^4 - 2x^2 + x}.$$

$$4.13. \lim_{x \rightarrow -1} \frac{5x^3 - 3x^2 + 7}{2x^4 + 3x^2 + 1}.$$

$$4.15. \lim_{x \rightarrow -\infty} \frac{2x^3 + 3x^2 + 5}{3x^2 - 4x + 1}.$$

$$4.2. \lim_{x \rightarrow \infty} \frac{3x^4 + 2x - 5}{2x^2 + x + 7}.$$

$$4.4. \lim_{x \rightarrow \infty} \frac{3x - x^6}{x^2 - 2x + 5}.$$

$$4.6. \lim_{x \rightarrow -\infty} \frac{2x^3 + 7x^2 + 4}{x^4 + 5x - 1}.$$

$$4.8. \lim_{x \rightarrow \infty} \frac{x^7 + 5x^2 - 4x}{3x^2 + 11x - 7}.$$

$$4.10. \lim_{x \rightarrow \infty} \frac{3x^4 + x^2 - 6}{2x^2 + 3x + 1}.$$

$$4.12. \lim_{x \rightarrow \infty} \frac{3x^3 + 4x^2 - 7x}{2x^2 + 7x - 3}.$$

$$4.14. \lim_{x \rightarrow \infty} \frac{5x^2 - 3x + 1}{1 + 2x - x^4}.$$

$$4.16. \lim_{x \rightarrow \infty} \frac{6x^2 - 5x + 2}{4x^3 + 2x - 1}.$$

- 4.17. $\lim_{x \rightarrow -\infty} \frac{11x^3 + 3x}{2x^2 - 2x + 1}$. 4.18. $\lim_{x \rightarrow \infty} \frac{8x^2 + 3x + 5}{4x^3 - 2x^2 + 1}$.
- 4.19. $\lim_{x \rightarrow -\infty} \frac{6x^3 + 5x^2 - 3}{2x^2 - x + 7}$. 4.20. $\lim_{x \rightarrow \infty} \frac{3x^2 + 4x - 7}{x^4 - 2x^3 + 1}$.
- 4.21. $\lim_{x \rightarrow -\infty} \frac{8x^5 - 4x^3 + 3}{2x^3 + x - 7}$. 4.22. $\lim_{x \rightarrow \infty} \frac{2x^2 - 7x + 1}{x^3 + 4x^2 - 3}$.
- 4.23. $\lim_{x \rightarrow -\infty} \frac{5x^4 - 2x^3 + 3}{2x^2 + 3x - 7}$. 4.24. $\lim_{x \rightarrow \infty} \frac{8x^3 + x^2 - 7}{2x^2 - 5x + 3}$.
- 4.25. $\lim_{x \rightarrow -\infty} \frac{3x^4 + 2x^2 - 8}{8x^3 - 4x + 5}$. 4.26. $\lim_{x \rightarrow \infty} \frac{3x^4 + 2x - 4}{3x^2 - 4x + 1}$.
- 4.27. $\lim_{x \rightarrow -\infty} \frac{7x^3 - 2x + 4}{2x^2 + x - 5}$. 4.28. $\lim_{x \rightarrow \infty} \frac{4x^3 + 5x^2 - 3x}{3x^2 + x - 10}$.
- 4.29. $\lim_{x \rightarrow -\infty} \frac{2x^2 + 10x - 11}{3x^4 - 2x + 5}$. 4.30. $\lim_{x \rightarrow \infty} \frac{7x^3 + 3x - 4}{2x^2 - 5x + 1}$.

5

- 5.1. $\lim_{x \rightarrow \infty} \frac{2x^2 + 3x - 5}{7x^3 - 2x^2 + 1}$. 5.2. $\lim_{x \rightarrow -\infty} \frac{3x^2 - 7x + 2}{x^4 + 2x - 4}$.
- 5.3. $\lim_{x \rightarrow \infty} \frac{7x^4 - 3x + 4}{3x^2 - 2x + 1}$. 5.4. $\lim_{x \rightarrow -\infty} \frac{2x^2 - x + 7}{3x^4 - 5x^2 + 10}$.
- 5.5. $\lim_{x \rightarrow -\infty} \frac{4x^3 - 2x^2 + x}{3x^2 - x}$. 5.6. $\lim_{x \rightarrow \infty} \frac{3x^4 - 2x + 1}{3x^2 + 2x - 5}$.
- 5.7. $\lim_{x \rightarrow \infty} \frac{2x^2 - 5x + 2}{x^4 + 3x^2 - 9}$. 5.8. $\lim_{x \rightarrow -\infty} \frac{5x^2 - 4x + 2}{4x^3 + 2x - 5}$.
- 5.9. $\lim_{x \rightarrow \infty} \frac{2x^3 - 3x^2 + 2x}{x^2 + 7x + 1}$. 5.10. $\lim_{x \rightarrow -\infty} \frac{3x^2 - 7x + 5}{4x^5 - 3x^3 + 2}$.
- 5.11. $\lim_{x \rightarrow \infty} \frac{7x^5 + 6x^4 - x^3}{2x^2 + 6x + 1}$. 5.12. $\lim_{x \rightarrow -\infty} \frac{4 - 3x - 2x^2}{3x^4 + 5x}$.
- 5.13. $\lim_{x \rightarrow -\infty} \frac{7 - 3x^4}{2x^3 + 3x^2 - 5}$. 5.14. $\lim_{x \rightarrow \infty} \frac{8x^4 + 7x^3 - 3}{3x^2 - 5x + 1}$.
- 5.15. $\lim_{x \rightarrow -\infty} \frac{3x + 7}{2 - 3x + 4x^2}$. 5.16. $\lim_{x \rightarrow -\infty} \frac{2x^3 - 3x + 1}{7x + 5}$.
- 5.17. $\lim_{x \rightarrow \infty} \frac{10x - 7}{3x^4 + 2x^3 + 1}$. 5.18. $\lim_{x \rightarrow -\infty} \frac{5x^4 - 3x^2}{1 + 2x + 3x^2}$.
- 5.19. $\lim_{x \rightarrow \infty} \frac{5x + 3}{x^3 - 4x^2 - x}$. 5.20. $\lim_{x \rightarrow -\infty} \frac{3x^4 + 5x}{2x^2 - 3x - 7}$.
- 5.21. $\lim_{x \rightarrow \infty} \frac{2x^2 - 5x + 3}{3x^4 - 2x^2 + x}$. 5.22. $\lim_{x \rightarrow -\infty} \frac{2x^5 - x^3}{4x^2 + 3x - 6}$.
- 5.23. $\lim_{x \rightarrow \infty} \frac{3x + 1}{x^3 - 5x^2 + 4x}$. 5.24. $\lim_{x \rightarrow -\infty} \frac{2 - x - 3x^2}{x^3 - 16}$.
- 5.25. $\lim_{x \rightarrow \infty} \frac{4x^2 - 10x + 7}{2x^3 - 3x}$. 5.26. $\lim_{x \rightarrow -\infty} \frac{2x^3 - 3x + 1}{x^5 + 4x^3}$.
- 5.27. $\lim_{x \rightarrow \infty} \frac{2x - 13}{x^7 - 3x^5 - 4x}$. 5.28. $\lim_{x \rightarrow -\infty} \frac{2x^2 - 3x + 1}{x^3 + 2x^2 + 5}$.
- 5.29. $\lim_{x \rightarrow \infty} \frac{x^3 - 81}{3x^2 + 4x + 2}$. 5.30. $\lim_{x \rightarrow -\infty} \frac{7x + 4}{3x^3 - 5x + 1}$.

6

- 6.1. $\lim_{x \rightarrow 3} \frac{x^2 + x - 12}{\sqrt{x} - 2 - \sqrt{4 - x}}$. 6.2. $\lim_{x \rightarrow -4} \frac{\sqrt{x+12} - \sqrt{4-x}}{x^2 + 2x - 8}$.
- 6.3. $\lim_{x \rightarrow -3} \frac{\sqrt{x+10} - \sqrt{4-x}}{2x^2 - x - 21}$. 6.4. $\lim_{x \rightarrow -2} \frac{\sqrt{2-x} - \sqrt{x+6}}{x^2 - x - 6}$.
- 6.5. $\lim_{x \rightarrow 1} \frac{\sqrt{3+2x} - \sqrt{x+4}}{3x^2 - 4x + 1}$. 6.6. $\lim_{x \rightarrow 2} \frac{x^2 - 3x + 2}{\sqrt{5-x} - \sqrt{x+1}}$.
- 6.7. $\lim_{x \rightarrow -1} \frac{3x^2 + 4x + 1}{\sqrt{x+3} - \sqrt{5+3x}}$. 6.8. $\lim_{x \rightarrow 4} \frac{2x^2 - 9x + 4}{\sqrt{5-x} - \sqrt{x-3}}$.

- 6.9. $\lim_{x \rightarrow 5} \frac{\sqrt{2x+1} - \sqrt{x+6}}{2x^2 - 7x - 15}$.
- 6.10. $\lim_{x \rightarrow -5} \frac{\sqrt{3x+17} - \sqrt{2x+12}}{x^2 + 8x + 15}$.
- 6.11. $\lim_{x \rightarrow 0} \frac{\sqrt{x^2+2} - \sqrt{2}}{\sqrt{x^2+1} - 1}$.
- 6.12. $\lim_{x \rightarrow 0} \frac{\sqrt{7-x} - \sqrt{7+x}}{\sqrt{7x}}$.
- 6.13. $\lim_{x \rightarrow 0} \frac{3x}{\sqrt{1+x} - \sqrt{1-x}}$.
- 6.14. $\lim_{x \rightarrow 4} \frac{\sqrt{2x+1} - 3}{\sqrt{x-2} - \sqrt{2}}$.
- 6.15. $\lim_{x \rightarrow -1} \frac{\sqrt{5+x} - 2}{\sqrt{8-x} - 3}$.
- 6.16. $\lim_{x \rightarrow 5} \frac{\sqrt{x+4} - 3}{\sqrt{x-1} - 2}$.
- 6.17. $\lim_{x \rightarrow 7} \frac{\sqrt{x-3} - 2}{\sqrt{x+2} - 3}$.
- 6.18. $\lim_{x \rightarrow 3} \frac{\sqrt{4x-3} - 3}{x^2 - 9}$.
- 6.19. $\lim_{x \rightarrow 3} \frac{\sqrt{5x+1} - 4}{x^2 + 2x - 15}$.
- 6.20. $\lim_{x \rightarrow 0} \frac{2 - \sqrt{x^2+4}}{3x^2}$.
- 6.21. $\lim_{x \rightarrow 0} \frac{\sqrt{x^2+4} - 2}{\sqrt{x^2+16} - 4}$.
- 6.22. $\lim_{x \rightarrow 0} \frac{3x}{\sqrt{5-x} - \sqrt{5+x}}$.
- 6.23. $\lim_{x \rightarrow 9} \frac{\sqrt{2x+7} - 5}{3 - \sqrt{x}}$.
- 6.24. $\lim_{x \rightarrow 4} \frac{2 - \sqrt{x}}{\sqrt{6x+1} - 5}$.
- 6.25. $\lim_{x \rightarrow 3} \frac{x^3 - 27}{\sqrt{3x} - x}$.
- 6.26. $\lim_{x \rightarrow 0} \frac{\sqrt{1+3x^2} - 1}{x^3 + x^2}$.
- 6.27. $\lim_{x \rightarrow -4} \frac{\sqrt{x+20} - 4}{x^3 + 64}$.
- 6.28. $\lim_{x \rightarrow 1} \frac{3x^2 - 2}{\sqrt{8+x} - 3}$.
- 6.29. $\lim_{x \rightarrow 0} \frac{\sqrt{9+x} - 3}{x^3 + x}$.
- 6.30. $\lim_{x \rightarrow 2} \frac{\sqrt{4x+1} - 3}{x^3 - 8}$.

7

- 7.1. $\lim_{x \rightarrow \infty} \left(\frac{x+4}{x+8} \right)^{-3x}$.
- 7.2. $\lim_{x \rightarrow \infty} \left(\frac{x}{x+1} \right)^{2x-3}$.
- 7.3. $\lim_{x \rightarrow \infty} \left(\frac{2x}{1+2x} \right)^{-4x}$.
- 7.4. $\lim_{x \rightarrow \infty} \left(\frac{x-1}{x} \right)^{2-3x}$.
- 7.5. $\lim_{x \rightarrow \infty} \left(\frac{2x+5}{2x+1} \right)^{5x}$.
- 7.6. $\lim_{x \rightarrow \infty} \left(\frac{x+3}{x} \right)^{-5x}$.
- 7.7. $\lim_{x \rightarrow \infty} \left(\frac{x+2}{x+1} \right)^{1+2x}$.
- 7.8. $\lim_{x \rightarrow \infty} \left(\frac{x+3}{x-1} \right)^{x-4}$.
- 7.9. $\lim_{x \rightarrow \infty} \left(\frac{2x}{2x-3} \right)^{3x}$.
- 7.10. $\lim_{x \rightarrow \infty} \left(\frac{x-7}{x} \right)^{2x+1}$.
- 7.11. $\lim_{x \rightarrow \infty} \left(\frac{x-1}{x+4} \right)^{3x+2}$.
- 7.12. $\lim_{x \rightarrow \infty} \left(\frac{2x+1}{2x-1} \right)^{x+2}$.
- 7.13. $\lim_{x \rightarrow \infty} \left(\frac{x-2}{x+1} \right)^{2x-3}$.
- 7.14. $\lim_{x \rightarrow \infty} \left(\frac{x}{x-3} \right)^{x-5}$.
- 7.15. $\lim_{x \rightarrow \infty} \left(\frac{3x-4}{3x+2} \right)^{2x}$.
- 7.16. $\lim_{x \rightarrow \infty} \left(\frac{2x-1}{2x+4} \right)^{3x-1}$.
- 7.17. $\lim_{x \rightarrow \infty} \left(\frac{2x-4}{2x} \right)^{-3x}$.
- 7.18. $\lim_{x \rightarrow \infty} \left(\frac{x+5}{x} \right)^{3x+4}$.
- 7.19. $\lim_{x \rightarrow \infty} \left(\frac{x-7}{x+1} \right)^{4x-2}$.
- 7.20. $\lim_{x \rightarrow \infty} \left(\frac{x+2}{x} \right)^{3-2x}$.
- 7.21. $\lim_{x \rightarrow \infty} \left(\frac{2-3x}{5-3x} \right)^{x'}$.
- 7.22. $\lim_{x \rightarrow \infty} \left(\frac{1-x}{2-x} \right)^{3x}$.
- 7.23. $\lim_{x \rightarrow \infty} \left(\frac{4x-1}{4x+1} \right)^{2x}$.
- 7.24. $\lim_{x \rightarrow \infty} \left(\frac{3x+4}{3x} \right)^{-2x}$.

$$7.25. \lim_{x \rightarrow \infty} \left(\frac{2x-1}{2x+4} \right)^{-x}.$$

$$7.27. \lim_{x \rightarrow \infty} \left(\frac{1+2x}{3+2x} \right)^{-x}.$$

$$7.29. \lim_{x \rightarrow \infty} \left(\frac{x}{x-1} \right)^{3-2x}.$$

$$7.26. \lim_{x \rightarrow \infty} \left(\frac{3x+4}{3x+5} \right)^{x+1}.$$

$$7.28. \lim_{x \rightarrow \infty} \left(\frac{3x}{3x+2} \right)^{x-2}.$$

$$7.30. \lim_{x \rightarrow \infty} \left(\frac{4-2x}{1-2x} \right)^{x+1}.$$

8

$$8.1. \lim_{x \rightarrow \infty} \left(\frac{2x+3}{5x+7} \right)^{x+1}.$$

$$8.3. \lim_{x \rightarrow \infty} \left(\frac{x+1}{2x-1} \right)^{3x}.$$

$$8.5. \lim_{x \rightarrow \infty} \left(\frac{5x+8}{x-2} \right)^{x+4}.$$

$$8.7. \lim_{x \rightarrow -\infty} \left(\frac{2x+1}{x-1} \right)^{4x}.$$

$$8.9. \lim_{x \rightarrow -\infty} \left(\frac{x+3}{2x-4} \right)^{x+2}.$$

$$8.11. \lim_{x \rightarrow \infty} \left(\frac{5x-3}{x+4} \right)^{x+3}.$$

$$8.13. \lim_{x \rightarrow -\infty} \left(\frac{x-5}{3x+4} \right)^{2x}.$$

$$8.15. \lim_{x \rightarrow -\infty} \left(\frac{x-2}{3x+1} \right)^{5x}.$$

$$8.17. \lim_{x \rightarrow \infty} \left(\frac{x-2}{3x+10} \right)^{3x}.$$

$$8.19. \lim_{x \rightarrow -\infty} \left(\frac{x+3}{3x-1} \right)^{2x}.$$

$$8.21. \lim_{x \rightarrow -\infty} \left(\frac{3x+7}{x+4} \right)^{4x}.$$

$$8.23. \lim_{x \rightarrow -\infty} \left(\frac{5x-7}{x+6} \right)^{2x}.$$

$$8.25. \lim_{x \rightarrow \infty} \left(\frac{1-2x}{3-x} \right)^{-x}.$$

$$8.27. \lim_{x \rightarrow -\infty} \left(\frac{3x-1}{2x+5} \right)^{3x}.$$

$$8.29. \lim_{x \rightarrow \infty} \left(\frac{5+x}{9x-4} \right)^{2x}.$$

$$8.2. \lim_{x \rightarrow \infty} \left(\frac{2x+1}{x-1} \right)^x.$$

$$8.4. \lim_{x \rightarrow -\infty} \left(\frac{2x-1}{4x+1} \right)^{3x-1}.$$

$$8.6. \lim_{x \rightarrow -\infty} \left(\frac{x+1}{3x-1} \right)^{2x+1}.$$

$$8.8. \lim_{x \rightarrow \infty} \left(\frac{x+1}{2x-1} \right)^{5x}.$$

$$8.10. \lim_{x \rightarrow -\infty} \left(\frac{2x+1}{3x-1} \right)^{x-1}.$$

$$8.12. \lim_{x \rightarrow -\infty} \left(\frac{2x-3}{7x+4} \right)^x.$$

$$8.14. \lim_{x \rightarrow \infty} \left(\frac{x+3}{4x-5} \right)^{2x}.$$

$$8.16. \lim_{x \rightarrow -\infty} \left(\frac{3x-4}{x+6} \right)^{x-1}.$$

$$8.18. \lim_{x \rightarrow -\infty} \left(\frac{2x-3}{x+4} \right)^{6x+1}.$$

$$8.20. \lim_{x \rightarrow \infty} \left(\frac{6x+5}{x-10} \right)^{5x}.$$

$$8.22. \lim_{x \rightarrow \infty} \left(\frac{x-1}{4x+5} \right)^{3x}.$$

$$8.24. \lim_{x \rightarrow \infty} \left(\frac{3-4x}{2-x} \right)^{6x}.$$

$$8.26. \lim_{x \rightarrow -\infty} \left(\frac{4+3x}{5+x} \right)^{7x}.$$

$$8.28. \lim_{x \rightarrow \infty} \left(\frac{1-x}{2-10x} \right)^{5x}.$$

$$8.30. \lim_{x \rightarrow -\infty} \left(\frac{x+5}{4x-2} \right)^{3x}.$$

9

$$9.1. \lim_{x \rightarrow 0} \frac{1 - \cos 8x}{3x^2}.$$

$$9.3. \lim_{x \rightarrow 0} \frac{\cos x - \cos 5x}{2x^2}.$$

$$9.5. \lim_{x \rightarrow 0} \frac{\operatorname{tg} x - \sin x}{3x^2}.$$

$$9.7. \lim_{x \rightarrow 1} (1-x) \operatorname{tg} \frac{\pi x}{2}.$$

$$9.9. \lim_{x \rightarrow 0} \frac{\operatorname{tg} 2x - \sin 2x}{x^2}.$$

$$9.11. \lim_{x \rightarrow 0} \left(\frac{1}{\operatorname{tg} x} - \frac{1}{\sin x} \right).$$

$$9.2. \lim_{x \rightarrow 0} \frac{\sin 3x - \sin x}{5x}.$$

$$9.4. \lim_{x \rightarrow 0} \frac{\operatorname{tg} 3x}{2 \sin x}.$$

$$9.6. \lim_{x \rightarrow 0} \frac{\arcsin 5x}{\sin 3x}.$$

$$9.8. \lim_{x \rightarrow \pi/2} \frac{1 - \sin x}{\pi - 2x}.$$

$$9.10. \lim_{x \rightarrow 0} \frac{1 - \cos^2 x}{x \operatorname{tg} x}.$$

$$9.12. \lim_{x \rightarrow 0} \frac{\sin^2 3x - \sin^2 x}{x^2}.$$

$$9.13. \lim_{x \rightarrow 0} \frac{\sin 7x + \sin 3x}{x \sin x}.$$

$$9.15. \lim_{x \rightarrow 0} \frac{\cos 2x - \cos 4x}{3x^2}.$$

$$9.17. \lim_{x \rightarrow 0} \frac{\operatorname{tg} 3x - \sin 3x}{2x^2}.$$

$$9.19. \lim_{x \rightarrow 0} \frac{\cos 4x - \cos^3 4x}{3x^2}.$$

$$9.21. \lim_{x \rightarrow 0} \frac{\cos^2 x - \cos^2 2x}{x^2}.$$

$$9.23. \lim_{x \rightarrow 0} \frac{1 - \cos^2 2x}{x \arcsin x}.$$

$$9.25. \lim_{x \rightarrow 0} \frac{\cos 5x - \cos x}{4x^2}.$$

$$9.27. \lim_{x \rightarrow \pi/2} \frac{1 - \sin x}{(\pi/2 - x)^2}.$$

$$9.29. \lim_{x \rightarrow 0} \frac{7x}{\sin x + \sin 7x}.$$

$$9.14. \lim_{x \rightarrow 0} \frac{1 - \cos 5x}{2x^2}.$$

$$9.16. \lim_{x \rightarrow 0} \frac{\operatorname{arctg} 2x}{\operatorname{tg} 3x}.$$

$$9.18. \lim_{x \rightarrow \pi/4} \frac{1 - \sin 2x}{\pi - 4x}.$$

$$9.20. \lim_{x \rightarrow 0} \left(\frac{1}{\sin 2x} - \frac{1}{\operatorname{tg} 2x} \right).$$

$$9.22. \lim_{x \rightarrow 0} \frac{\arcsin 5x}{x^2 - x}.$$

$$9.24. \lim_{x \rightarrow 0} \frac{1 - \cos 4x}{x \sin x}.$$

$$9.26. \lim_{x \rightarrow 0} \frac{\sin 5x + \sin x}{\arcsin x}.$$

$$9.28. \lim_{x \rightarrow \pi/2} (\pi/2 - x) \operatorname{tg} x.$$

$$9.30. \lim_{x \rightarrow 0} \frac{\cos x - \cos^3 x}{5x^2}.$$

Найти указанные пределы.

$$1. \lim_{x \rightarrow -2} \frac{5x^2 + 13x + 6}{3x^2 + 2x - 8}.$$

$$\begin{aligned} \blacktriangleright \lim_{x \rightarrow -2} \frac{5x^2 + 13x + 6}{3x^2 + 2x - 8} &= \lim_{x \rightarrow -2} \frac{(x+2)(5x+3)}{(x+2)(3x-4)} = \\ &= \lim_{x \rightarrow -2} \frac{5x+3}{3x-4} = \frac{7}{10} = 0,7. \blacktriangleleft \end{aligned}$$

$$2. \lim_{x \rightarrow 4} \frac{3x^2 - 10x - 8}{4x^2 + 6x - 64}.$$

$$\blacktriangleright \lim_{x \rightarrow 4} \frac{3x^2 - 10x - 8}{4x^2 + 6x - 64} = \frac{0}{24} = 0. \blacktriangleleft$$

$$3. \lim_{x \rightarrow \infty} \frac{7x^4 + 2x^3 + 5}{6x^4 + 3x^2 - 7x}.$$

$$\blacktriangleright \lim_{x \rightarrow \infty} \frac{7x^4 + 2x^3 + 5}{6x^4 + 3x^2 - 7x} = \lim_{x \rightarrow \infty} \frac{x^4(7 + 2/x + 5/x^4)}{x^4(6 + 3/x^2 - 7/x^3)} = \frac{7}{6}. \blacktriangleleft$$

$$4. \lim_{x \rightarrow -\infty} \frac{10x - 3}{2x^3 + 4x + 3}.$$

$$\begin{aligned} \blacktriangleright \lim_{x \rightarrow -\infty} \frac{10x - 3}{2x^3 + 4x + 3} &= \lim_{x \rightarrow -\infty} \frac{x(10 - 3/x)}{x^3(2 + 4/x^2 + 3/x^3)} = \\ &= \lim_{x \rightarrow -\infty} \frac{10 - 3/x}{x^2(2 + 4/x^2 + 3/x^3)} = \frac{10}{\infty} = 0. \blacktriangleleft \end{aligned}$$

$$5. \lim_{x \rightarrow -\infty} \frac{2x^5 + 3x^3 - 4x}{3x^2 - 4x + 2}.$$

$$\begin{aligned} \blacktriangleright \lim_{x \rightarrow -\infty} \frac{2x^5 + 3x^3 - 4x}{3x^2 - 4x + 2} &= \lim_{x \rightarrow -\infty} \frac{x^5(2 + 3/x^2 - 4/x^4)}{x^2(3 - 4/x + 2/x^2)} = \\ &= \lim_{x \rightarrow -\infty} \frac{x^3(2 + 3/x^2 - 4/x^4)}{3 - 4/x + 2/x^2} = \frac{-\infty}{3} = -\infty. \blacktriangleleft \end{aligned}$$

$$6. \lim_{x \rightarrow 4} \frac{\sqrt{21+x}-5}{x^3-64}.$$

$$\begin{aligned} \blacktriangleright \lim_{x \rightarrow 4} \frac{\sqrt{21+x}-5}{x^3-64} &= \lim_{x \rightarrow 4} \frac{(\sqrt{21+x}-5)(\sqrt{21+x}+5)}{(x^3-64)(\sqrt{21+x}+5)} = \\ &= \lim_{x \rightarrow 4} \frac{21+x-25}{(x^3-64)(\sqrt{21+x}+5)} = \end{aligned}$$

$$\begin{aligned}
&= \lim_{x \rightarrow 4} \frac{x-4}{(x-4)(x^2+4x+16)(\sqrt{21+x}+5)} = \\
&= \lim_{x \rightarrow 4} \frac{1}{(x^2+4x+16)(\sqrt{21+x}+5)} = \frac{1}{480}. \blacktriangleleft
\end{aligned}$$

$$7. \lim_{x \rightarrow \infty} \left(\frac{2x}{2x-3} \right)^{2-5x}.$$

$$\begin{aligned}
\blacktriangleright \lim_{x \rightarrow \infty} \left(\frac{2x}{2x-3} \right)^{2-5x} &= \lim_{x \rightarrow \infty} \left(1 + \frac{2x}{2x-3} - 1 \right)^{2-5x} = \\
&= \lim_{x \rightarrow \infty} \left(1 + \frac{2x-2x+3}{2x-3} \right)^{2-5x} = \lim_{x \rightarrow \infty} \left(1 + \frac{3}{2x-3} \right)^{2-5x} = \\
&= \lim_{x \rightarrow \infty} \left(\left(1 + \frac{3}{2x-3} \right)^{(2x-3)/3} \right)^{3(2-5x)/(2x-3)} = \\
&= \lim_{x \rightarrow \infty} e^{3(2-5x)/(2x-3)} = e^{-15/2}. \blacktriangleleft
\end{aligned}$$

$$8. \lim_{x \rightarrow -\infty} \left(\frac{4x+3}{2x-5} \right)^{1+7x}.$$

$$\blacktriangleright \lim_{x \rightarrow -\infty} \left(\frac{4x+3}{2x-5} \right)^{1+7x} = \lim_{x \rightarrow -\infty} 2^{1+7x} = 2^{-\infty} = 0. \blacktriangleleft$$

$$9. \lim_{x \rightarrow \pi} \frac{1 - \sin(x/2)}{\pi^2 - x^2}.$$

$$\begin{aligned}
\blacktriangleright \lim_{x \rightarrow \pi} \frac{1 - \sin(x/2)}{\pi^2 - x^2} &= \lim_{x \rightarrow \pi} \frac{1 - \cos(\pi/2 - x/2)}{\pi^2 - x^2} = \\
&= \lim_{x \rightarrow \pi} \frac{2 \sin^2((\pi - x)/4)}{(\pi - x)(\pi + x)} = \lim_{x \rightarrow \pi} \frac{2 \sin((\pi - x)/4) \sin((\pi - x)/4)}{4 \cdot \frac{\pi - x}{4} (\pi + x)} = \\
&= \frac{1}{2} \lim_{x \rightarrow \pi} \frac{\sin((\pi - x)/4)}{\pi + x} = \frac{1}{2} \frac{0}{2\pi} = 0. \blacktriangleleft
\end{aligned}$$

