10. Исследовать функцию на непрерывность и сделать её схематический чертеж.

1. $y = \begin{cases} 2^x, & x \le 0, \\ x+1, & 0 < x \le 2, \\ 4, & x > 2. \end{cases}$ 2. $y = \begin{cases} 2x+3, & x \le 0, \\ x^2+3, & 0 < x \le 1, \\ 3, & x > 1. \end{cases}$ 3. $y = \begin{cases} x, & x \le 0, \\ \text{tg}\,x, & 0 < x \le \dfrac{\pi}{4} \\ 2, & x > \dfrac{\pi}{4}. \end{cases}$

4. $y = \begin{cases} 2x+1, & x \le 0, \\ 3x^2+1, & 0 < x \le 2, \\ 10, & x > 2. \end{cases}$ 5. $y = \begin{cases} 3x-1, & x \le 0, \\ x^3-1, & 0 < x \le 1, \\ 1, & x > 1. \end{cases}$ 6. $y = \begin{cases} \cos x, & x \le \dfrac{\pi}{2}, \\ 0, & \dfrac{\pi}{2} < x < \pi, \\ 2, & x \ge \pi. \end{cases}$

7. $y = \begin{cases} 1, & x \le \pi, \\ \sin x, & \pi < x \le 2\pi, \\ x-2\pi, & x > 2\pi. \end{cases}$ 8. $y = \begin{cases} 1-\cos x, & x \le 0, \\ 2x, & 0 < x \le 2, \\ x, & x > 2. \end{cases}$ 9. $y = \begin{cases} 1-2x, & x < 0, \\ \cos x, & 0 \le x < \pi, \\ 2, & x \ge \pi. \end{cases}$

10. $y = \begin{cases} -4x, & x \le 0, \\ \sin x, & 0 < x \le \pi, \\ \pi, & x > \pi. \end{cases}$ 11. $y = \begin{cases} 3, & x \le -1, \\ \sqrt{x+2}, & -1 < x \le 2, \\ x^2 - x, & x > 2. \end{cases}$ 12. $y = \begin{cases} x+2, & x < -1, \\ x^2 + 1, & -1 \le x < 2, \\ 5, & x \ge 2. \end{cases}$

13. $y = \begin{cases} 1 - x^2, & x \le 0, \\ \cos x, & 0 < x \le \pi, \\ 2, & x > \pi. \end{cases}$ 14. $y = \begin{cases} 2x+1, & x \le 0, \\ \sqrt{x+1}, & 0 < x \le 3, \\ 3, & x > 3. \end{cases}$ 15. $y = \begin{cases} 5^x, & x < 0, \\ 2x^2 + 1, & 0 \le x < 1, \\ 2, & x \ge 1. \end{cases}$

16. $y = \begin{cases} 3, & x \le 1, \\ x+2, & 1 < x \le 3, \\ \sqrt{x+1}, & x > 3. \end{cases}$ 17. $y = \begin{cases} x-1, & x \le 0, \\ -(x-1)^2, & 0 < x \le 3, \\ 4, & x > 3. \end{cases}$ 18. $y = \begin{cases} -2, & x < 0, \\ x+1, & 0 \le x < 2, \\ \sqrt{5+x^2}, & x \ge 2. \end{cases}$

19. $y = \begin{cases} 3\sin x, & x < 0, \\ x^2, & 0 \le x < 2, \\ 2x+3, & x \ge 2. \end{cases}$ 20. $y = \begin{cases} x+1, & x \le 1, \\ \sqrt{x+3}, & 1 < x \le 6, \\ 7, & x > 6. \end{cases}$ 21. $y = \begin{cases} 2\cos x, & x \le 0, \\ 2 - 3x, & 0 < x \le 2, \\ 1, & x > 2. \end{cases}$

22. $y = \begin{cases} \sqrt{9+x^2}, & x \le 0, \\ 3, & 0 < x \le 2, \\ 2x+1, & x > 2. \end{cases}$ 23. $y = \begin{cases} x^2, & x \le 0, \\ tgx, & 0 < x < \dfrac{\pi}{2}, \\ 3, & x \ge \dfrac{\pi}{2}. \end{cases}$ 24. $y = \begin{cases} 5^x, & x \le 0, \\ x^3 + 1, & 0 < x < 1, \\ 3, & x \ge 1. \end{cases}$

25. $y = \begin{cases} 2x-1, & x < 1, \\ x^2 - 1, & 1 \le x \le 2, \\ 3, & x > 2. \end{cases}$ 26. $y = \begin{cases} x^3, & x \le 0 \\ x+3, & 0 < x \le 3, \\ 6, & x > 3. \end{cases}$ 27. $y = \begin{cases} x^2 + 1, & x \le 0, \\ 2x-1, & 0 < x \le 1, \\ \sqrt{x}, & x > 1. \end{cases}$

28. $y = \begin{cases} x^2, & x \le 0, \\ \sqrt{x}, & 0 < x \le 1, \\ x+2, & x > 1. \end{cases}$ 29. $y = \begin{cases} x+1, & x < 0, \\ 2^x, & 0 \le x < 1, \\ 3, & x \ge 1. \end{cases}$ 30. $y = \begin{cases} 1, & x \le 0, \\ \sqrt{1+x^2}, & 0 < x \le 3, \\ 3, & x > 3. \end{cases}$

11. Исследовать функцию на непрерывность в заданных точках и сделать её схематический чертёж.

1. $y = 10^{\frac{1}{x-1}}, \; x_1 = 2, \; x_2 = 1.$ 2. $y = 9^{\frac{1}{3-x}}, \; x_1 = 1, \; x_2 = 3.$ 3. $y = 3^{\frac{1}{2-x}}, \; x_1 = 3, \; x_2 = 2.$

4. $y = 3^{\frac{1}{2-x}}, \; x_1 = 2, \; x_2 = 3.$ 5. $y = 2^{\frac{1}{5+x}}, \; x_1 = -6, \; x_2 = -5.$ 6. $y = 3^{\frac{1}{3-x}}, \; x_1 = 3, \; x_2 = 4.$

7. $y = 5^{\frac{1}{x-5}}, \; x_1 = 3, \; x_2 = 5.$ 8. $y = 4^{\frac{1}{3-x}}, \; x_1 = 2, \; x_2 = 3.$ 9. $y = 7^{\frac{1}{2x+4}}, \; x_1 = -1, \; x_2 = -2.$

10. $y = 9^{\frac{1}{x-2}}$, $x_1 = 2$, $x_2 = 4$.   11. $y = 8^{\frac{1}{x+2}}$, $x_1 = 1$, $x_2 = -2$.   12. $y = 3^{\frac{1}{x+4}}$, $x_1 = -3$, $x_2 = -4$.

13. $y = 10^{\frac{1}{x-1}}$, $x_1 = 2$, $x_2 = 1$.   14. $y = 8^{\frac{1}{2-3x}}$, $x_1 = 0$, $x_2 = \frac{2}{3}$.   15. $y = 2^{\frac{1}{2-x}}$, $x_1 = 3$, $x_2 = 2$.

16. $y = 2^{\frac{1}{x+3}}$, $x_1 = -2$, $x_2 = -3$.   17. $y = 4^{\frac{1}{3-2x}}$, $x_1 = 1$, $x_2 = \frac{3}{2}$.   18. $y = 2^{\frac{1}{5-x}}$, $x_1 = 6$, $x_2 = 5$.

19. $y = 6^{\frac{1}{x-3}}$, $x_1 = 4$, $x_2 = 3$.   20. $y = 7^{\frac{1}{3-x}}$, $x_1 = 4$, $x_2 = 3$.   21. $y = 10^{\frac{1}{x+4}}$, $x_1 = 0$, $x_2 = -4$.

22. $y = 8^{\frac{1}{4-x}}$, $x_1 = 3$, $x_2 = 4$.   23. $y = 3^{\frac{1}{5-x}}$, $x_1 = 3$, $x_2 = 5$.   24. $y = 11^{\frac{1}{3-x}}$, $x_1 = 3$, $x_2 = 2$.

25. $y = 5^{\frac{1}{2x-1}}$, $x_1 = \frac{1}{2}$, $x_2 = 1$.   26. $y = 6^{\frac{1}{3-4x}}$, $x_1 = 1$, $x_2 = \frac{3}{4}$.   27. $y = 4^{\frac{1}{2x+3}}$, $x_1 = -1$, $x_2 = -\frac{3}{2}$.

28. $y = 3^{\frac{1}{2x-1}}$, $x_1 = \frac{1}{2}$, $x_2 = 1$.   29. $y = 5^{\frac{1}{x-2}}$, $x_1 = 2$, $x_2 = 3$.   30. $y = 16^{\frac{1}{4-x}}$, $x_1 = 0$, $x_2 = 4$.

9. Найти и указать характер точек разрыва функции.

1. $y=\dfrac{1}{x+2}$;

2. $y=\dfrac{1}{(x+2)^2}$;

3. $y=\dfrac{\cos x}{x}$;

4. $y=\dfrac{1}{1+2^{\frac{1}{x}}}$;

5. $y=\dfrac{4}{x+2}$;

6. $y=\dfrac{-5}{x}$;

7. $y=tg\,2x$;

8. $y=\dfrac{9}{9-x^2}$;

9. $y=\dfrac{x+1}{|x+1|}$;

10. $y=x+\dfrac{x+1}{|x+1|}$;

11. $y=\dfrac{x}{x+2}$;

12. $y=2^{\frac{1}{x-2}}$;

13. $y=\dfrac{1}{1+3^{\frac{1}{x}}}$;

14. $y=\dfrac{3}{x+3}$;

15. $y=\dfrac{3}{x-3}$;

16. $y=tg\,\dfrac{x}{2}$;

17. $y=\dfrac{1}{1-x^2}$;

18. $y=3^{\frac{1}{x-3}}$;

19. $y=\dfrac{x^3+x}{2|x|}$;

20. $y=\dfrac{3}{(x+3)^2}$;

21. $y=1-2^{\frac{1}{x}}$;

22. $y=2-\dfrac{|x|}{x}$;

23. $y=\dfrac{1-x^2}{14(x-x^3)}$;

24. $y=\dfrac{1}{x^2-1}$;

25. $y=\dfrac{1}{1+3^{\frac{1}{x}}}$;

26. $y=\dfrac{2}{x-2}$;

27. $y=tg\,3x$;

28. $y=\dfrac{2^{\frac{1}{x}}-1}{2^{\frac{1}{x}}+1}$;

29. $y=\dfrac{1}{1+2^{\frac{1}{x-1}}}$;

30. $y=2^{\frac{1}{x+2}}$.

10. Найти асимптоты функции.

1. $y=\dfrac{x^2}{\sqrt{x^2-1}}$

2. $y=\sqrt{x^2-4}$

3. $y=\dfrac{x^3-4x}{3x^2-4}$

4. $y=\dfrac{x^3-5x}{5-3x^2}$

5. $y=\dfrac{x^3}{1+x^2}$

6. $y=\dfrac{x^3+3x^2-2x-2}{2-3x^2}$

7. $y=\dfrac{2x^2-1}{\sqrt{x^2-2}}$

8. $y=\dfrac{3x^2-7}{2x+1}$

9. $y=\dfrac{2-x^2}{\sqrt{9x^2-4}}$

10. $y=\dfrac{x^2+1}{\sqrt{4x^2-3}}$

11. $y=\dfrac{4x^3+9}{4x^2+8}$

12. $y=\dfrac{x^2-3}{\sqrt{3x^2-2}}$

13. $y=\dfrac{2x^2-6}{x-2}$

14. $y=\dfrac{17-x^2}{4x+5}$

15. $y=\dfrac{x^2+2x+1}{x^2+1}$

16. $y=\dfrac{x^2}{x+4}$

17. $y = x + \dfrac{1}{x^2}$

18. $y = \dfrac{2x^3 + 2x^2 - 3x - 1}{2 - 4x^2}$

19. $y = \dfrac{x^4}{x^3 - 1}$

20. $y = \dfrac{x^3}{(x+1)^2}$

21. $y = \dfrac{x^2 - 11}{4x - 3}$

22. $y = \dfrac{x^2 - 6x + 4}{3x - 2}$

23. $y = \dfrac{4x^3 - 3x}{4x^2 - 1}$

24. $y = \dfrac{21 - x^2}{7x + 9}$

25. $y = \dfrac{x^2 + 2x - 1}{2x + 1}$

26. $y = \dfrac{x^2 + 6x + 9}{x + 4}$

27. $y = \dfrac{x^2 - 2x + 2}{x + 3}$

28. $y = \dfrac{3x^2 - 10}{3 - 2x}$

29. $y = \dfrac{x^2 + 16}{\sqrt{9x^2 - 8}}$

30. $y = \dfrac{3x^2 - 10}{\sqrt{4x^2 - 1}}$