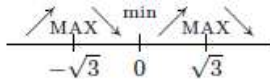
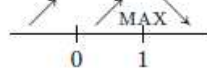


Vyšetřete monotónnost a lokální extrémy zadaných funkcí

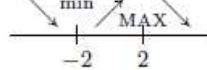
1. $y = -\frac{1}{9}x^4 + \frac{2}{3}x^2$

Návod: $y' = -\frac{4}{9}x(x^2 - 3)$, 

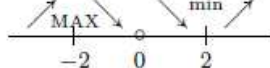
2. $y = 4x^3 - 3x^4$

Návod: $y' = 12x^2(1 - x)$, 

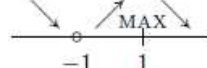
3. $y = -2 + 12x - x^3$

Návod: $y' = 3(2 - x)(2 + x)$, 

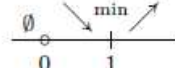
4. $y = x + \frac{4}{x}$

Návod: $y' = \frac{(x-2)(x+2)}{x^2}$, 

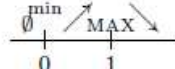
5. $y = \frac{x}{(x+1)^2}$

Návod: $y' = \frac{1-x}{(x+1)^3}$, 

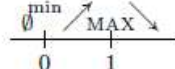
6. $y = x^2 - 2 \ln x$

Návod: $y' = 2 \frac{(x-1)(x+1)}{x}$, 

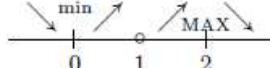
7. $y = (3 - x)\sqrt{x}$

Návod: $y' = \frac{3}{2\sqrt{x}}(1 - x)$, 

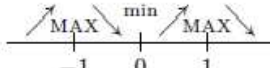
8. $y = 2\sqrt{x} - x$

Návod: $y' = \frac{1-\sqrt{x}}{\sqrt{x}}$, 

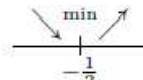
9. $y = \frac{x^2}{1-x}$

Návod: $y' = \frac{x(2-x)}{(1-x)^2}$, 

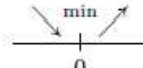
10. $y = 1 + x^2 - \frac{x^4}{4}$

Návod: $y' = -2x(x-1)(x+1)$, 

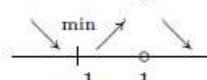
11. $y = \frac{x-2}{\sqrt{x^2+1}}$

Návod: $y' = \frac{2x+1}{(x^2+1)^{\frac{3}{2}}}$, 

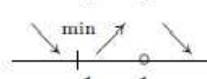
12. $y = \frac{x^2}{x^2+1}$

Návod: $y' = \frac{2x}{(1+x^2)^2}$, 

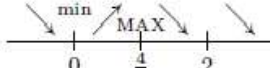
13. $y = \left(\frac{1+x}{1-x}\right)^2$

Návod: $y' = -4 \frac{x+1}{(x-1)^3}$, 

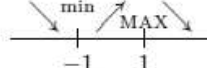
14. $y = \left(\frac{1+x}{1-x}\right)^4$

Návod: $y' = -8 \frac{(x+1)^3}{(x-1)^5}$, 

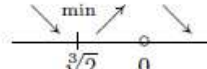
15. $y = \sqrt[3]{2x^2 - x^3}$

Návod: $y' = \frac{1}{3} \frac{4-3x}{\sqrt[3]{x(2-x)^2}}$, 

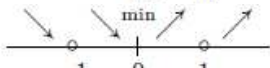
16. $y = \frac{x}{1+x^2}$

Návod: $y' = \frac{1-x^2}{(1+x^2)^2}$, 

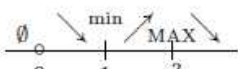
17. $y = \frac{1-x^3}{x^2}$

Návod: $y' = -\frac{x^3+2}{x^3}$, 

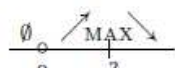
18. $y = \frac{1+x^2}{1-x^2} = -1 + \frac{2}{1-x^2}$

Návod: $y' = \frac{4x}{(1-x^2)^2}$, 

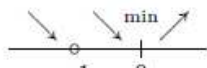
19. $y = \frac{\ln^2 x}{x}$

Návod: $y' = \frac{\ln x(2-\ln x)}{x^2}$, 

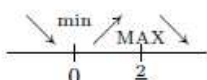
20. $y = \frac{\ln x}{\sqrt{x}}$

Návod: $y' = \frac{2-\ln x}{3\sqrt{x}}$, 

21. $y = \frac{e^x}{1+x}$

Návod: $y' = \frac{xe^x}{(x+1)^2}$, 

22. $y = x^{\frac{2}{3}}e^{-x}$

Návod: $y' = e^{-x} \frac{2-3x}{3\sqrt[3]{x}}$, 

23. $y = x^2 e^{-x}$

Návod: $y' = e^{-x} x(2-x)$,

24. $y = x e^{\frac{1}{x}}$

Návod: $y' = e^{\frac{1}{x}} \frac{x-1}{x^2}$,

25. $y = x - \ln(1+x)$

Návod: $y' = \frac{x^2+x-1}{x+1}$,

26. $y = x - \ln(1+x^2)$

Návod: $y' = \frac{(x-1)^2}{x^2+1}$,

27. $y = e^{-x} \sin x$

Návod: $y' = e^{-x} (\cos x - \sin x)$, a 2π -periodicky

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

Návod: $y' = \frac{x^4+3}{(x^2+1)^2}$,

29. $y = \frac{x^2}{2} + \frac{8}{x^3}$

Návod: $y' = \frac{x^5-24}{x^4}$,

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

Návod: $y' = \frac{1-x}{\sqrt{x(2-x)}}$,

31. $y = (x+1)^{10} e^{-x}$

Návod: $y' = e^{-x} (x+1)^9 (9-x)$,

32. $y = \frac{x^2}{2^x}$

Návod: $y' = \frac{x(2-x \ln 2)}{2^x}$,

Určete inflexní body a intervaly konvexnosti a konkávnosti

33. $y = x e^{-x}$

Návod: $y'' = -e^{-x} (2-x)$,

34. $y = \frac{2(x^2-x+1)}{(x-1)^2}$

Návod: $y'' = 4 \frac{x+2}{(x-1)^4}$,

35. $y = 1 + x^2 - \frac{x^4}{2}$

Návod: $y'' = 2 - 6x^2$,

36. $y = \frac{x^3}{3-x^2}$

Návod: $y'' = -6 \frac{x(x^2+9)}{(x^2-3)^3}$,

37. $y = \frac{x^2+7}{x^2+3}$

Návod: $y'' = 24 \frac{(x-1)(x+1)}{x^2+3}$,

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

Návod: $y'' = 2 \frac{x(x^2-3)}{(1+x^2)^3}$,

39. $y = x^2 e^{x-2}$

Návod: $y'' = (x^2+4x+2)e^{x-2}$,

40. $y = (x^2+1)e^{-x^2}$

Návod: $y'' = 2x^2 e^{-x^2} (2x^2-3)$,

41. $y = \frac{e^x}{x+1}$

Návod: $y'' = \frac{e^x(x^2+1)}{(x+1)^3}$,