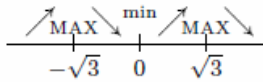
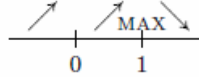


## Vyšetřete monotónnost a lokální extrémy zadaných funkcí

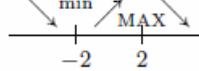
1.  $y = -\frac{1}{9}x^4 + \frac{2}{3}x^2$

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

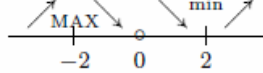
2.  $y = 4x^3 - 3x^4$

Návod:  $y' = 12x^2(1 - x)$ , 

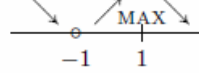
3.  $y = -2 + 12x - x^3$

Návod:  $y' = 3(2 - x)(2 + x)$ , 

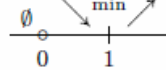
4.  $y = x + \frac{4}{x}$

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

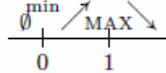
5.  $y = \frac{x}{(x+1)^2}$

Návod:  $y' = \frac{1-x}{(x+1)^3}$ , 

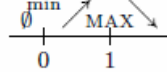
6.  $y = x^2 - 2 \ln x$

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

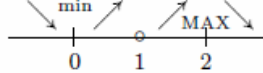
7.  $y = (3 - x)\sqrt{x}$

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

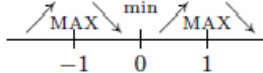
8.  $y = 2\sqrt{x} - x$

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

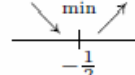
9.  $y = \frac{x^2}{1-x}$

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

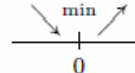
10.  $y = 1 + x^2 - \frac{x^4}{4}$

Návod:  $y' = -2x(x-1)(x+1)$ , 

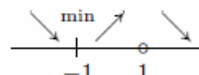
11.  $y = \frac{x-2}{\sqrt{x^2+1}}$

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

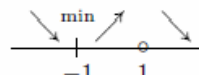
12.  $y = \frac{x^2}{x^2+1}$

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

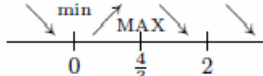
13.  $y = \left(\frac{1+x}{1-x}\right)^2$

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

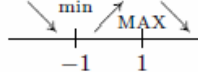
14.  $y = \left(\frac{1+x}{1-x}\right)^4$

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

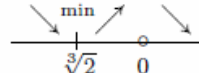
15.  $y = \sqrt[3]{2x^2 - x^3}$

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

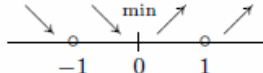
16.  $y = \frac{x}{1+x^2}$

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

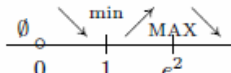
17.  $y = \frac{1-x^3}{x^2}$

Návod:  $y' = -\frac{x^3+2}{x^3}$ , 

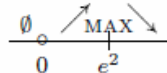
18.  $y = \frac{1+x^2}{1-x^2} = -1 + \frac{2}{1-x^2}$

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

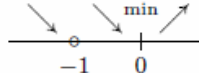
19.  $y = \frac{\ln^2 x}{x}$

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

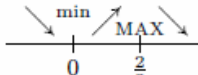
20.  $y = \frac{\ln x}{\sqrt{x}}$

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

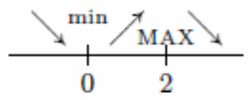
21.  $y = \frac{e^x}{1+x}$

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

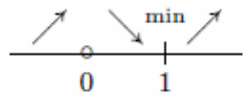
22.  $y = x^{\frac{2}{3}}e^{-x}$

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

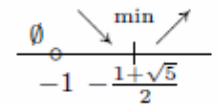
23.  $y = x^2 e^{-x}$

Návod:  $y' = e^{-x} x(2-x)$ , 

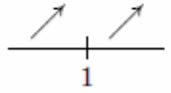
24.  $y = x e^{\frac{1}{x}}$

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

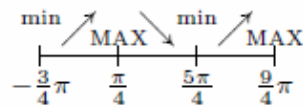
25.  $y = x - \ln(1+x)$

Návod:  $y' = \frac{x^2+x-1}{x+1}$ , 


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

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

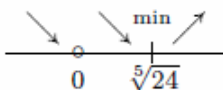
27.  $y = e^{-x} \sin x$

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

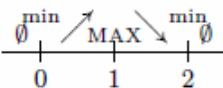
28.  $y = x + \frac{2x}{1+x^2}$

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

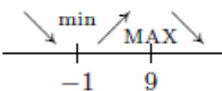
29.  $y = \frac{x^2}{2} + \frac{8}{x^3}$

Návod:  $y' = \frac{x^5-24}{x^4}$ , 

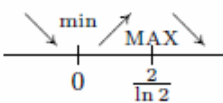
30.  $y = \sqrt{2x-x^2}$

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

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

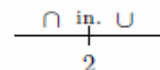
Návod:  $y' = e^{-x}(x+1)^9(9-x)$ , 

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

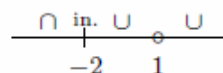
Návod:  $y' = \frac{x(2-x \ln 2)}{2^x}$ , 

### Určete inflexní body a intervaly konvexnosti a konkávnosti

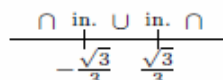
33.  $y = x e^{-x}$

Návod:  $y'' = -e^{-x}(2-x)$ , 

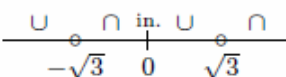
34.  $y = \frac{2(x^2-x+1)}{(x-1)^2}$

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

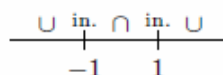
35.  $y = 1 + x^2 - \frac{x^4}{2}$

Návod:  $y'' = 2 - 6x^2$ , 

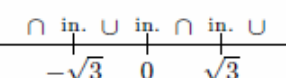
36.  $y = \frac{x^3}{3-x^2}$

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

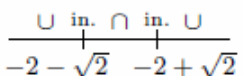
37.  $y = \frac{x^2+7}{x^2+3}$

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

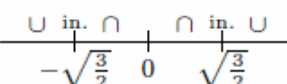
38.  $y = \frac{x}{x^2+1}$

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