1a)

$$f\left(-x\right)=\frac{x^{3}-8x}{x^{2}-9}=-\frac{-x^{3}+8x}{x^{2}-9}=-f(x)$$

b)

$$\left(x^{3}-8x\right):\left(x^{2}-9\right)=-x+\frac{x}{x^{2}-9}$$

$$\lim\_{x\to \infty }\frac{x}{x^{2}-9}=0$$

c)

x(x2+8)=0 x=0 f(0)=0

x2*=*-8

X(0|0)

d)



x=-3 x=3

Zähler: 54 Zähler: -3

VZW +- VZW +-

e)

$$f^{'}\left(x\right)=\frac{\left(-3x^{2}+8\right)\left(x^{2}-9\right)-2x(-x^{3}+8x)}{\left(x^{2}-9\right)^{2}}=\frac{-3x^{4}+27x^{2}+8x^{2}-72+2x^{4}-16x^{2}}{\left(x^{2}-9\right)^{2}}=\frac{-x^{4}+19x^{2}-72}{\left(x^{2}-9\right)^{2}}$$

$$f^{''}\left(x\right)=\frac{\left(-4x^{3}+38x\right)\left(x^{2}-9\right)^{2}-4x\left(x^{2}-9\right)\left(-x^{4}+19x^{2}-72\right)}{\left(x^{2}-9\right)^{4}}=\frac{-4x^{5}+38x^{3}+36x^{3}-342x+4x^{5}-76x^{3}+288x}{\left(x^{2}-9\right)^{3}}$$

$$=\frac{-2x^{3}-54}{\left(x^{2}-9\right)^{3}}=-2x\frac{\left(x^{2}+27\right)}{\left(x^{2}-9\right)^{3}} $$

-x4+19x-72=0 x2=z

z2-19x+72=0

$$z=9,5\pm \sqrt{9,5^{2}-72}$$

z1=13,77 z2=5,23

x=-2,29 x=2,29 x=-3,71 x=3,71

$$f^{''}\left(-2,29\right)=2∙2,29\frac{\left(-2,29\right)^{2}+27}{\left(2,29^{2}-9\right)^{3}}=-2,79$$

$$f\left(-2,29\right)=\frac{-\left(-2,29\right)^{3}-8∙2,29}{2,29^{2}-9}=1,68$$

H1(-2,29|1,68)

$$f^{''}\left(2,29\right)=-2∙2,29\frac{\left(2,29\right)^{2}+27}{\left(2,29^{2}-9\right)^{3}}=-2,79$$

$$f\left(2,29\right)=\frac{-2,29^{3}+8∙2,29}{2,29^{2}-9}=-1,68$$

T1(2,29|-1,68)

$$f^{''}\left(-3,71\right)=2∙3,71\frac{\left(-3,71\right)^{2}+27}{\left(3,71^{2}-9\right)}=63,49$$

$$f\left(-3,71\right)=\frac{-\left(-3,71\right)^{3}-8∙3,71}{3,71^{2}-9}=4,49$$

T2(-3,71|4,49)

$$f^{''}\left(3,71\right)=-2∙3,71\frac{3,71^{2}+27}{\left(3,71^{2}-9\right)}=-63,49$$

$$f\left(3,71\right)=\frac{-3,71^{3}+8∙3,71}{3,71^{2}-9}=-4,49$$

H2(3,71|-4,49)