

1a)

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

b)

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

$$\lim_{x \rightarrow \infty} \frac{x}{x^2 - 9} = 0$$

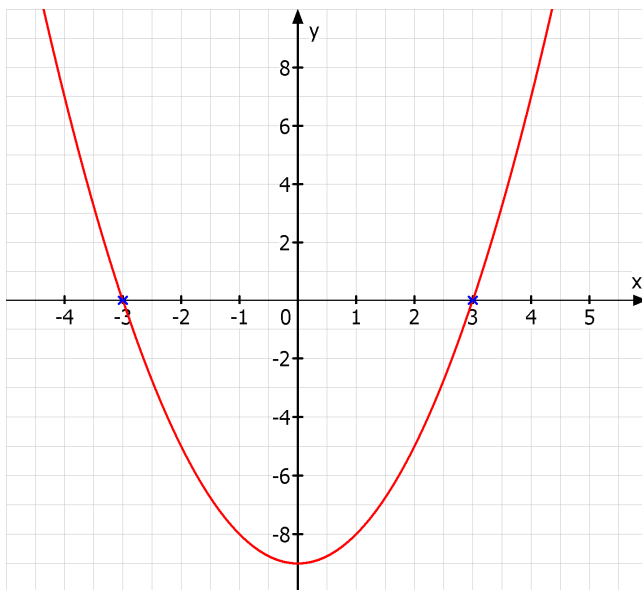
c)

$$x(x^2 + 8) = 0 \quad x = 0 \quad f(0) = 0$$

$$x^2 = -8$$

$$x(0|0)$$

d)



$$x = -3$$

$$x = 3$$

Zähler: 54

Zähler: -3

VZW +-
-

VZW +-
+

e)

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

$$f''(x) = \frac{(-4x^3 + 38x)(x^2 - 9)^2 - 4x(x^2 - 9)(-x^4 + 19x^2 - 72)}{(x^2 - 9)^4}$$

$$= \frac{-4x^5 + 38x^3 + 36x^3 - 342x + 4x^5 - 76x^3 + 288x}{(x^2 - 9)^3}$$

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

$$-x^4 + 19x - 72 = 0 \quad x^2 = z$$

$$z^2 - 19z + 72 = 0$$

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

$$z_1 = 13,77$$

$$z_2 = 5,23$$

$$x = -2,29 \quad x = 2,29$$

$$x = -3,71 \quad x = 3,71$$

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

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

$$H_1(-2,29 | 1,68)$$

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

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

$$T_1(2,29 | -1,68)$$

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

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

$$T_2(-3,71 | 4,49)$$

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

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

$$H_2(3,71 | -4,49)$$