

HW 18 Solutions:

(1)

4.6.1

$$f(x) = \frac{x}{x^2-1}$$

a)  $D(f) = (-\infty, -1) \cup (-1, 1) \cup (1, \infty)$

(1)

$= \frac{x}{(x+1)(x-1)}$

b.)

$(0,0)$

(3)

(1)

$$\frac{1}{x} = y$$

c.)

$(0,0)$

(3)

4.6.5

$$f(x) = \frac{x^2+x-12}{x^2+x}$$

a)  $D(f) = (-\infty, -4) \cup (-1, 0) \cup (0, \infty)$

(3)

$$= \frac{(x+4)(x-3)}{x(x+1)}$$

b.) No y intercept ( $x=0$  is an asymptote)

c.)  $(-4,0), (3,0)$

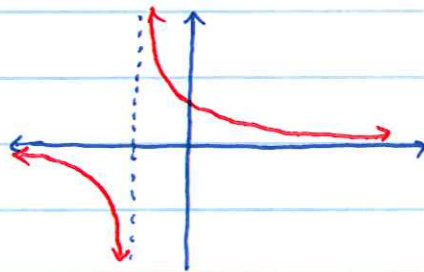
4.6.7

$$f(x) = \frac{3}{x+1}$$

vertical asymptote:  $x=-1$

(1)

Extra points:



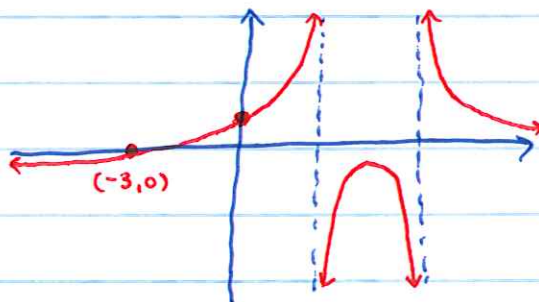
4.6.10

$$f(x) = \frac{x+3}{x^2-6x+8} = \frac{x+3}{(x-2)(x-4)}$$

vertical asymptotes are  $x=2, x=4$

(2)

Extra points:



4.6.13

$$f(x) = \frac{3}{x+1}$$

$$y=0$$

①

$(-\infty, -1) \cup (-1, 1) \cup (1, \infty) = \mathbb{R} \setminus \{-1\}$

$\frac{x}{1-x} = (x) \cdot \frac{1}{1-x}$

4.6.16

$$f(x) = \frac{2x^3 - x^2 + 1}{x^2 + 1}$$

No horizontal asymptotes

①

②

4.6.17

$$f(x) = \frac{3x^2 - 4x^3}{7x^3 + x^2 - x + 1}$$

$$y = \frac{-4}{7}$$

①

②

$(-\infty, 0) \cup (0, 1) \cup (1, \infty) = \mathbb{R} \setminus \{0, 1\}$

$\frac{1-x+x^2}{x^2+x} = (x) \cdot \frac{1-x+x^2}{x^2+x}$

(asymptotes sind  $x=0$ )

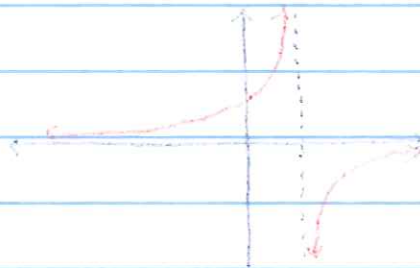
$(0, \varepsilon) \cup (\sigma, 1^-)$

$\frac{(1-x)(1+x)}{(1+x)x}$

①

$1-x$  ist immer positiv

$\frac{1}{1+x} = (x) \cdot \frac{1}{1+x}$



Extremwerte

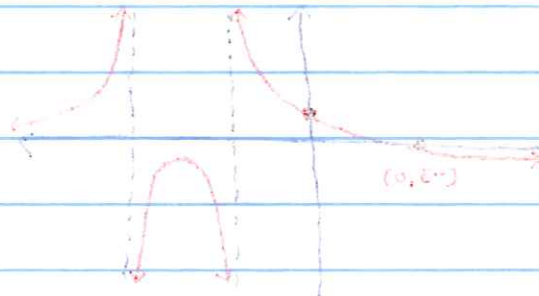
01.0.10

Die Ableitung ist

②

$p=x, q=x$

$$\frac{p+q}{(p-x)(q-x)} = \frac{x+x}{(x-x)(x-x)} = (x) \cdot \frac{2}{(x-x)^2}$$



Extremwerte