1. Dan je polinom $p(x) = x^3 - 3x + 2$

a) Določite ničle

b) Nariši graf

c) Izračunaj $p(15)$

$p(x) = x^3 - 3x + 2$

NIČLE

$x^3 - 3x + 2 = 0$

Delitelji: $1, 2, -1, -2$

	x^3	x^2	x	
	1	0	-3	2
-2		-2	4	-2
	1	-2	1	0

$x_1 = -2$

$1x^2 - 2x + 1 = 0$

$a = 1 \quad b = -2 \quad c = 1$

$D = b^2 - 4ac$

$D = (-2)^2 - 4 \cdot 1 \cdot (+1)$

$D = 4 - 4 = \underline{\underline{0}}$

$x_2 = \frac{-b + \sqrt{D}}{2a}$ $\quad x_3 = \frac{-b - \sqrt{D}}{2a}$

$x_2 = \frac{-(-2) + \sqrt{0}}{2 \cdot 1}$ $\quad x_3 = \frac{-(-2) - \sqrt{0}}{2 \cdot 1}$

$x_2 = \frac{2 + 0}{2}$ $\quad x_3 = \frac{2 - 0}{2}$

$x_2 = 1$ $\quad x_3 = 1$

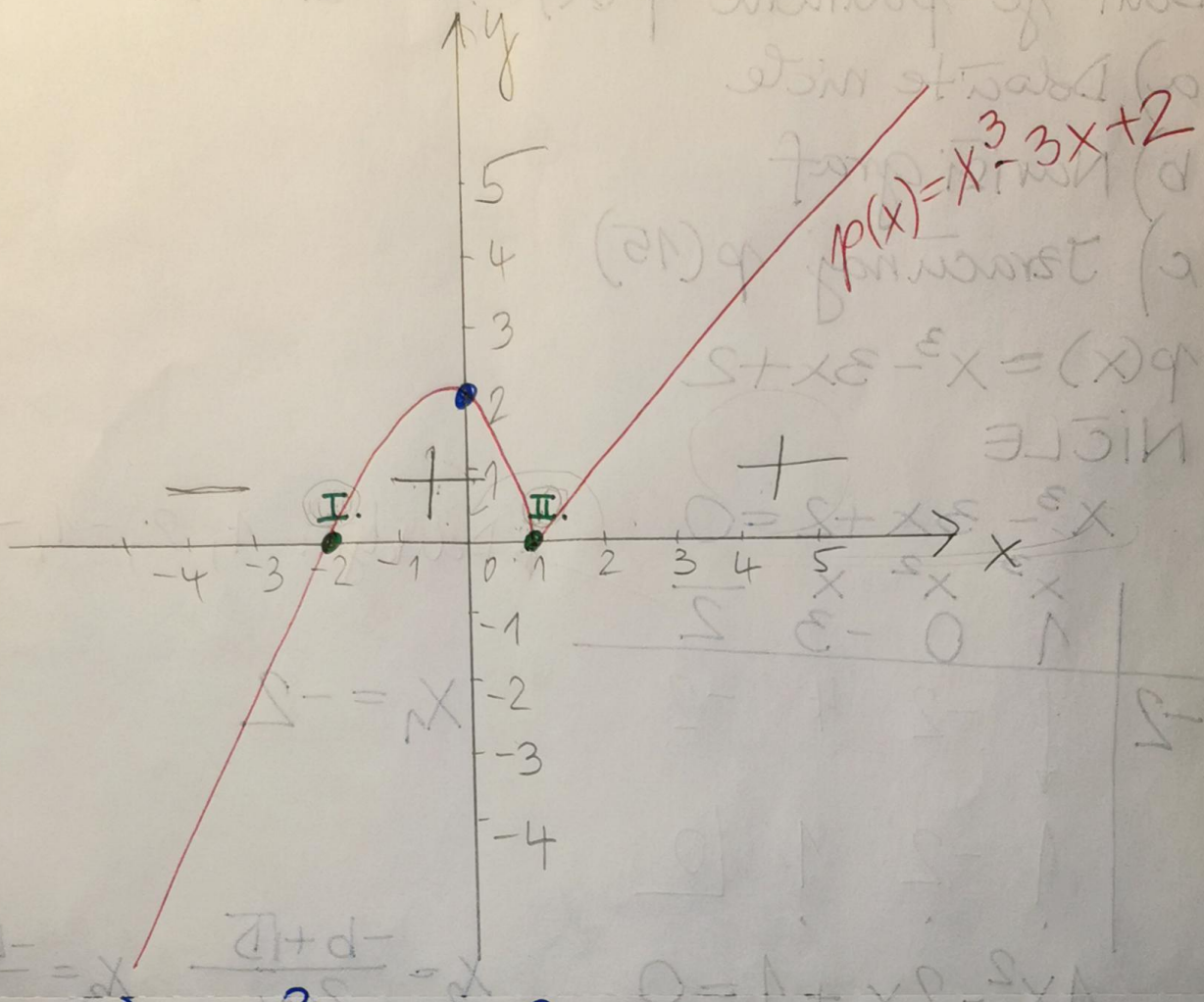
$\boxed{x_1 = -2 \text{ (I. št)} \quad x_2 = 1 \text{ (II. št)}}$

ZAČETNA VREDNOST $\boxed{x = 0}$

$p(0) = 0^3 - 3 \cdot 0 + 2 = \underline{\underline{2}}$

PREDZNAK

$p(10) = 10^3 - 3 \cdot 10 + 2 = +972$



c) $p(x) = x^3 - 3x + 2$

$p(15) = ?$

$p(15) = 15^3 - 3 \cdot 15 + 2 = \underbrace{3332}_{y}$

$A(15, 3332)$

2.) Dan je polinom $p(x)=x^3-3x-2$

a) Nariši graf

b) Točki $A(-100, y_1)$ in $B(1, y_2)$ ležita na grafu polinoma. Izračunajte koordinati y_1 in y_2.

a) $p(x)=x^3-3x-2$

NIČLE

$x^3-3x-2=0$

	x^3	x^2	x	
	1	0	-3	-2
-1		-1	1	2
	1	-1	-2	0

→ Delitelji: $-1, 1, 2, -2$

$x_1=-1$

$1x^2-1x-2=0$

$a=1 \quad b=-1 \quad c=-2$

$D=b^2-4ac$

$D=(-1)^2-4\cdot 1\cdot(-2)$

$D=1+8=9$

$x_2=\frac{-b+\sqrt{D}}{2a}$ $\quad x_3=\frac{-b-\sqrt{D}}{2a}$

$x_2=\frac{-(-1)+\sqrt{9}}{2\cdot 1}$ $\quad x_3=\frac{-(-1)-\sqrt{9}}{2\cdot 1}$

$x_2=\frac{1+3}{2}$ $\quad x_3=\frac{1-3}{2}$

$x_2=2$ $\quad x_3=-1$

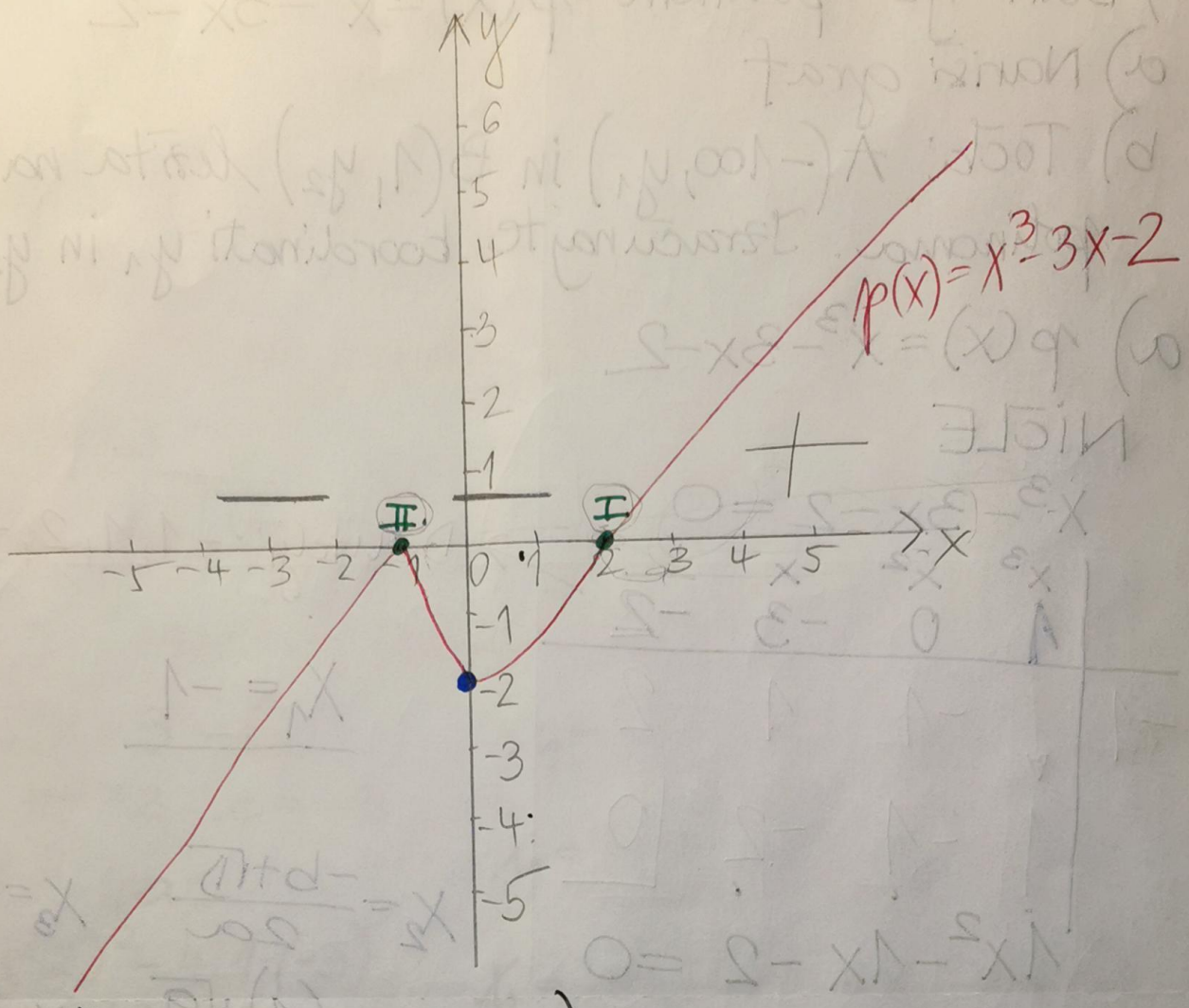
$x_1=-1$ (II. st) $\quad x_2=2$ (I. st)

ZAČETNA VREDNOST $x=0$

$p(0)=0^3-3\cdot 0-2=-2$

PREDZNAK

$p(10)=10^3-3\cdot 10-2=(+)968$



b) $A(-100, y_1)$ $B(1, y_2)$

$y_1 = ?$ $p(x) = x^3 - 3x - 2$

$p(-100) = (-100)^3 - 3 \cdot (-100) - 2 = -999\,702$

$A(-100, \underbrace{-999\,702}_{y_1})$

$y_2 = ?$

$p(1) = 1^3 - 3 \cdot 1 - 2 = 1 - 3 - 2 = -4$

$B(1, -4)$

RACIONALNA FUNKCIJA

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

$3^2-2\cdot3-3 = 9-6-3 = 0$

1. NIČLE (Števec ulomka = 0)

$x-1=0$

$\boxed{x_1 = 1}$ (I. st)

2. POLI (imenovalec ulomka = 0)

$x^2-2x-3=0$

$a=1 \quad b=-2 \quad c=-3$

$D=b^2-4ac$

$D=(-2)^2-4\cdot1\cdot(-3)$

$D=4+12=\underline{\underline{16}}$

$x_1=\frac{-b+\sqrt{D}}{2a}$ $\qquad$ $x_2=\frac{-b-\sqrt{D}}{2a}$

$x_1=\frac{-(-2)+\sqrt{16}}{2\cdot1}$ $\qquad$ $x_2=\frac{-(-2)-\sqrt{16}}{2\cdot1}$

$x_1=\frac{2+4}{2}$ $\qquad$ $x_2=\frac{2-4}{2}$

$\boxed{x_1=3 \text{ (I. st)} \quad x_2=-1 \text{ (I. st)}}$

3. ZAČETNA VREDNOST $x=0$

$$f(0)=\frac{0-1}{0^2-2\cdot0-3}=\frac{-1}{-3}=\underline{\underline{\frac{1}{3}}}$$

$\frac{x^2}{x^2}=1 \quad \frac{3x^2}{x^2}=3$

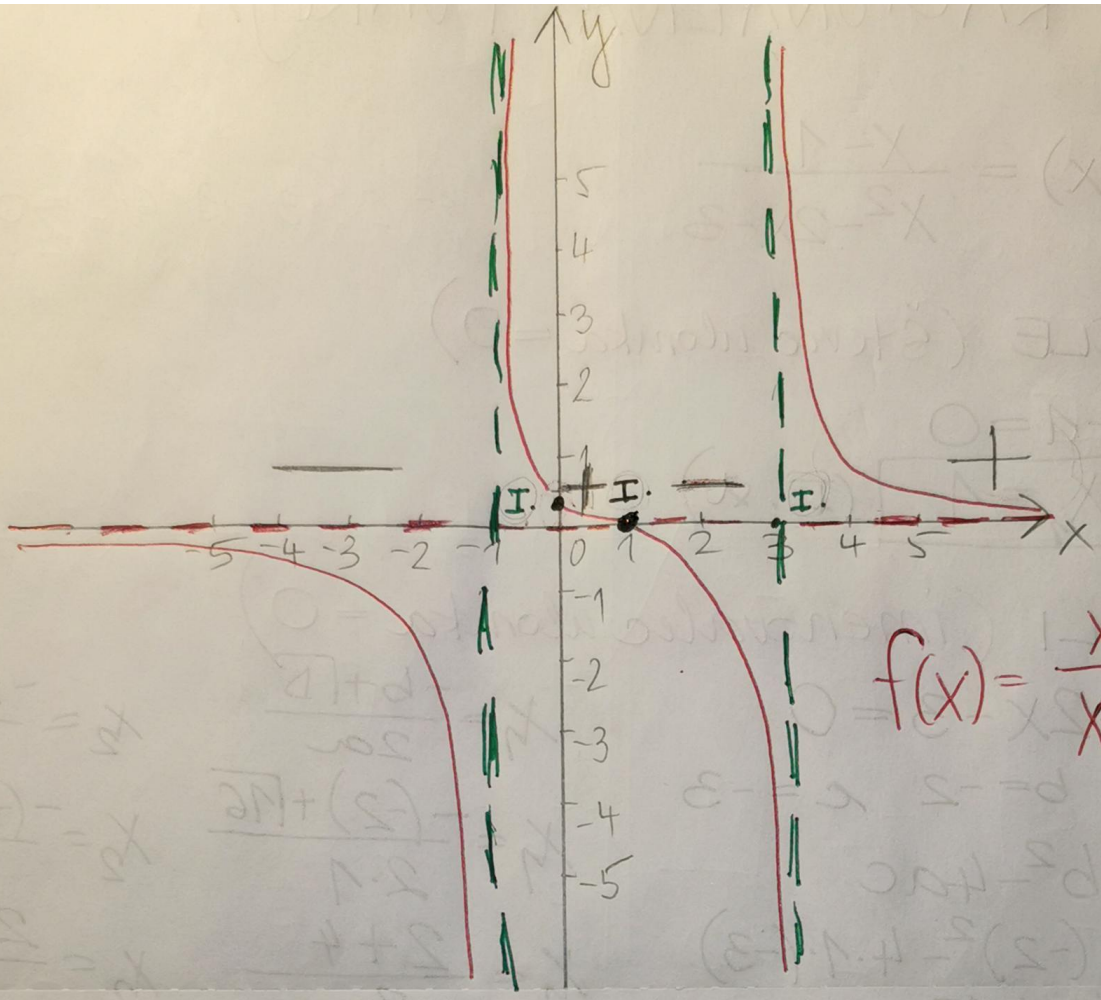
4. VODORAVNA ASIMPTOTA y

$f(x)=\frac{x-1}{x^2-2x-3}$ $\qquad$ $y=\frac{x}{x^2}=0$

(ker je stopnja x v števcu manjša od st. x v imenovalcu)

5. PREDZNAK

$$f(10)=\frac{10-1}{10^2-2\cdot10-3}=\frac{9}{77}=(+)$$



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

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

1. NIČLE

$2x+2=0$

$2x=-2 \,/:2$

$x=-1$ (I. st)

2. POLI

$x-1=0$

$x=1$ (I. st)

3. ZAČ. VREDNOST

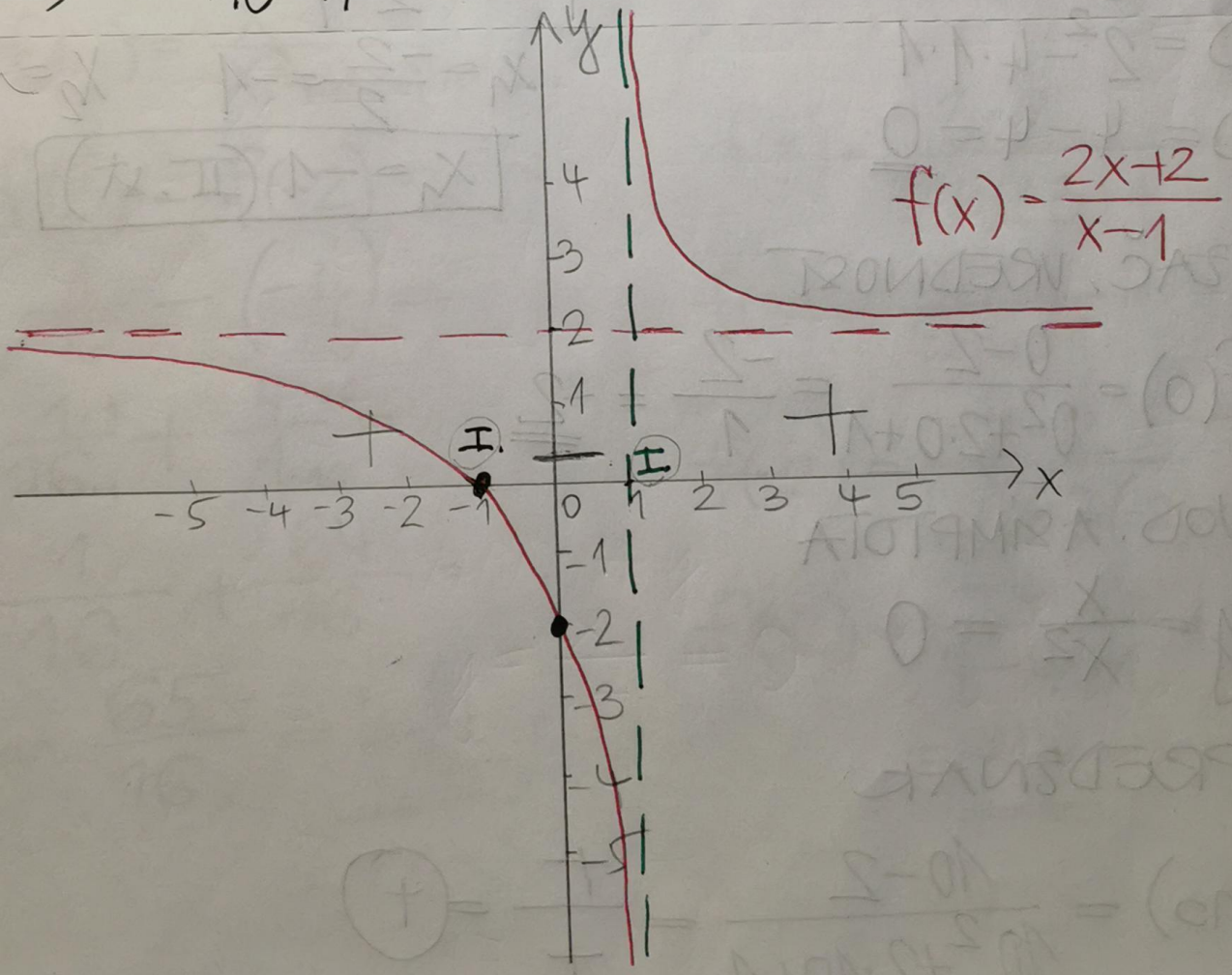
$$f(0) = \frac{2\cdot 0+2}{0-1} = \frac{2}{-1} = \underline{\underline{-2}}$$

4. VOD. ASIMPTOTA

$$y = \frac{2x}{x} = \underline{\underline{2}}$$

5. PREDZNAK

$$f(10) = \frac{2\cdot 10+2}{10-1} = \frac{+}{+} = (+)$$



Dana je funkcija $f(x)=\frac{x-2}{x^2+2x+1}$

a) Nariši graf

b) Natančno izračunajte $f(3)-f(-2)$.

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

1. NIČLE

$x-2=0$

$x=2$ (I. st)

2. POLI

$x^2+2x+1=0$

$a=1 \quad b=2 \quad c=1$

$D=b^2-4ac$

$D=2^2-4\cdot1\cdot1$

$D=4-4=\underline{0}$

$x_1=\frac{-b+\sqrt{D}}{2a} \qquad x_2=\frac{-b-\sqrt{D}}{2a}$

$x_1=\frac{-2+\sqrt{0}}{2\cdot1}$

$x_1=\frac{-2}{2}=-1 \qquad x_2=-1$

$\boxed{x_1=-1 \text{ (II. st)}}$

3. ZAČ. VREDNOST

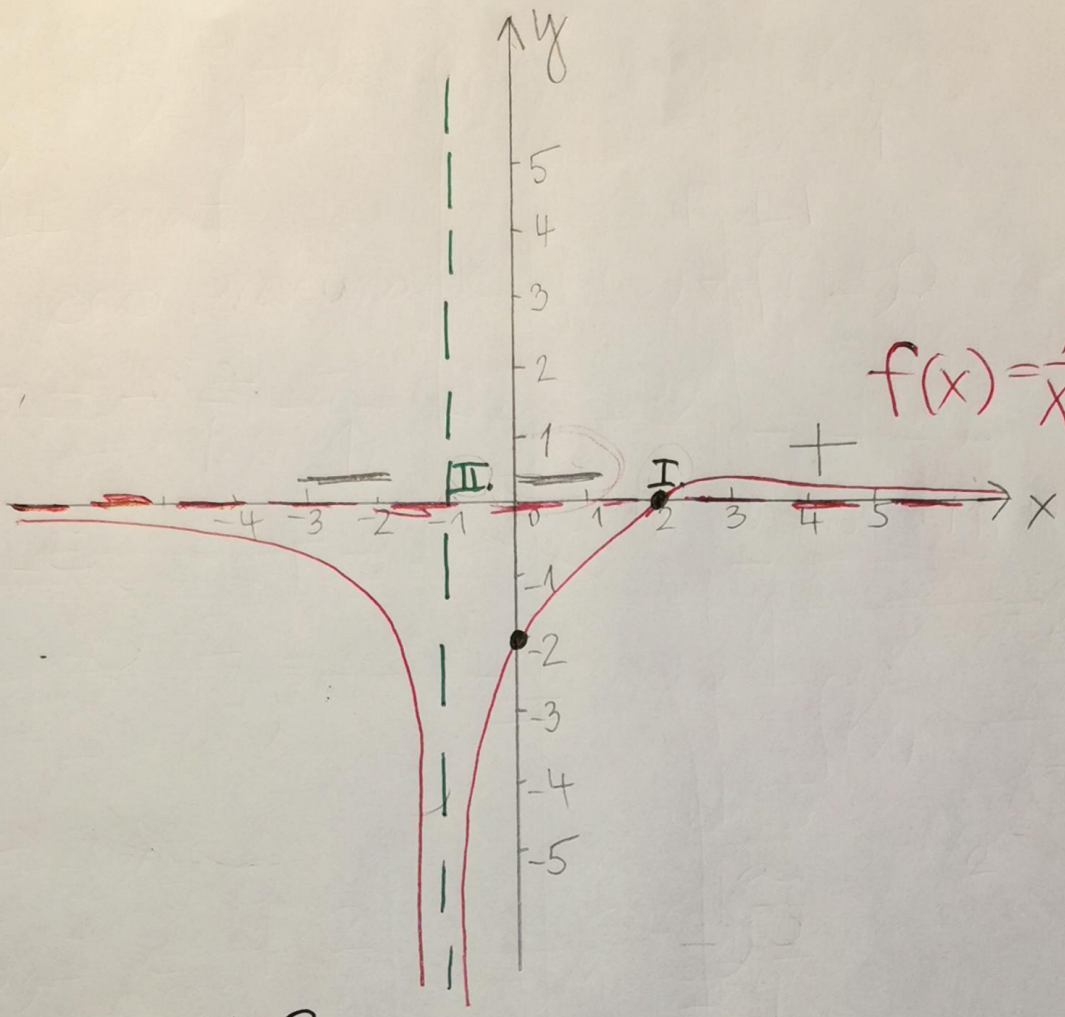
$f(0)=\frac{0-2}{0^2+2\cdot0+1}=\frac{-2}{1}=\underline{\underline{-2}}$

4. VOD. ASIMPTOTA

$y=\frac{x}{x^2}=0$

5. PREDZNAK

$f(10)=\frac{10-2}{10^2+2\cdot10+1}=\frac{+}{+}=(+)$



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

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

$f(3)-f(-2)=$

$\frac{1}{16}-(-4)=$

$\frac{1\cdot 1}{16\cdot 1}+\frac{4\cdot 16}{1\cdot 16}=$

$=\frac{1}{16}+\frac{64}{16}=$

$=\frac{65}{16}=4\frac{1}{16}$

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

$f(3)=\frac{1}{9+6+1}=\frac{1}{16}$

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

$f(-2)=\frac{-4}{4-4+1}=-\frac{4}{1}$

$=-4$