UČNI LIST – Polinomi – 2

1) Določi neznani koeficient tako, da bo imel polinom zahtevano ničlo:
   a) $p(x)=x^3-2x^2-18x+(a+50),\ x=4$
   b) $p(x)=x^3+(a+3)x^2-11x-10,\ x=-2$

2) Določi neznana koeficienta *a* in *b* tako, da bo imel polinom zahtevani ničli:
   a) $p(x)=x^4-3x^3+ax^2+bx-30,\ x_1=-2 \text{ in } x_2=3$
   b) $p(x)=x^3+(a+1)x^2+x+(b-2),\ x_1=2 \text{ in } x_2=3$

3) Določi koeficienta *a* in *b* tako, da bo imel polinom $p(x)=x^3+ax^2+bx-6$ ničlo $x_1=-2$, pri deljenju s polinomom $(x-1)$ pa dobimo ostanek –12.

4) Izračunaj vse ničle simetričnega polinoma $p(x)=24x^4+50x^3-173x^2+50x+24$.

5) Reši enačbo:
   $3^{x^3+4x^2-x-7}=0,\overline{037}$

6) Poišči polinom tretje stopnje z vodilnim koeficientom –6 in ničlami $x_1=1,\ x_2=-\frac{1}{2} \text{ in } x_3=-2$.

7) Poišči polinom 3. stopnje z ničlami $x_1=-1,\ x_2=\frac{1}{3} \text{ in } x_3=3$, če gre njegov graf skozi točko $A(1,-8)$.

8) Poišči polinom četrte stopnje z ničlami $x_1=-2,\ x_2=-1,\ x_3=1 \text{ in } x_4=2$, če gre njegov graf skozi točko $A(0,8)$.

9) Poišči simetrični polinom pete stopnje, ki ima ničli $x_1=-3 \text{ in } x_2=2$, če gre njegov graf skozi $A(1,-32)$.

10) Izračunaj presečišča premice in polinoma:
   a) $p(x)=x^4+x^3-3x^2-14x-34,\ y=3x-4$
   b) $p(x)=2x^3+x^2+2x+5,\ y=4x+6$

11) Izračunaj presečišči dveh polinomov:
   a) $p(x)=3x^3+9x^2-5x+2,\ q(x)=2x^2+2x+5$
   b) $p(x)=2x^3+4x^2-x+3,\ q(x)=5x^2+4x+5$

12) Izračunaj ničle in nariši graf polinoma:
   a) $p(x)=x^3+7x^2+14x+8$
   b) $p(x)=-x^3-3x^2+x+3$
   c) $p(x)=x^3-x^2-8x+12$
   d) $p(x)=-x^3-x^2+4x+4$

13) Izračunaj ničle in nariši graf polinoma:
   a) $p(x)=x^3-4x^2+x+6$
   b) $p(x)=6x^3+7x^2-1$
   c) $p(x)=x^3-7x^2+15x-9$
   d) $p(x)=x^3-7x+6$

14) Zapišite vse ničle polinoma $p(x)=x(x+1)^2(2x-1)(5x+2)^2$.

15) Zapiši ničle, začetno vrednost in nariši graf polinoma:

a) $p(x)=(x+1)(x+2)(x+3)$

b) $p(x)=(x+1)^2(5x-2)$

c) $p(x)=(x-1)^2(x+2)^2$

d) $p(x)=-x^3(x+1)^2(x+3)^3$

16) Izračunaj ničle in nariši graf polinoma:

a) $p(x)=x^3-x^2-5x-3$

b) $p(x)=x^3-5x^2+3x+9$

c) $p(x)=x^3+5x^2+7x+3$

d) $p(x)=x^3-9x^2+24x-16$

17) Izračunaj ničle in nariši graf polinoma:

a) $p(x)=x^4-3x^3-3x^2+11x-6$

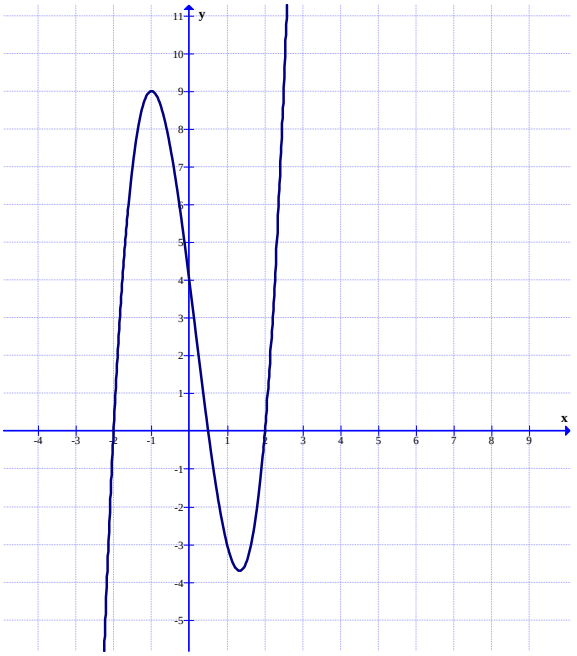
b) $p(x)=x^4+2x^3-4x^2-8x$

c) $p(x)=x^4-2x^2-3$

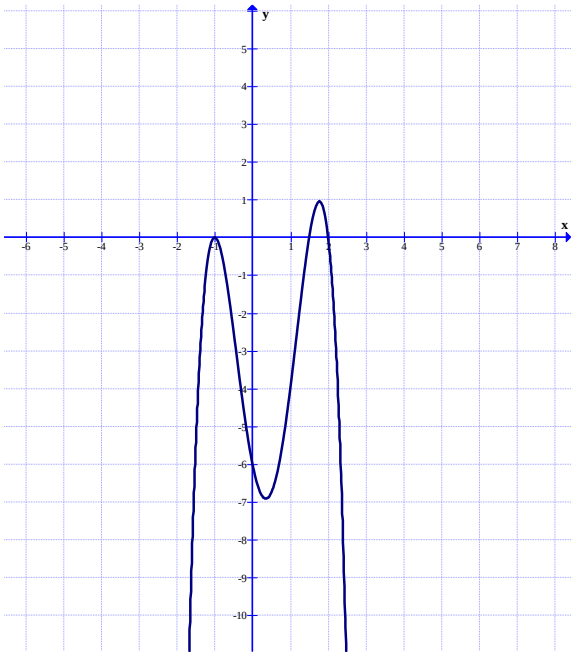
d) $p(x)=-3x^4+3$

18) Dan je polinom $p(x)=x^3-6x^2+9x-4$. Poišči njegove ničle, nato pa izračunaj presečišča s premico $y=4x-4$. Nariši graf polinoma in premico!

19) a) Iz grafa polinoma 3. stopnje ugotovi, kje ima ničle in kolikšna je začetna vrednost. Kolikšna je vrednost polinoma pri $x=-1$? Poišči tudi enačbo tega polinoma.



b) Iz grafa polinoma četrte stopnje ugotovi, kje ima ničle in kolikšna je začetna vrednost. Kolikšna je vrednost polinoma pri $x=1$? Določi še enačbo tega polinoma.



20) Reši neenačbe:

a) $x^3-6x^2+11x-6<0$

b) $-x^3+2x^2+5x-6\le 0$

c) $x^3+3x^2-4\ge 0$

d) $x^3+5x^2-9x-45\le 0$

21) Reši neenačbe:

a) $x^3-9x^2+26x-24>0$

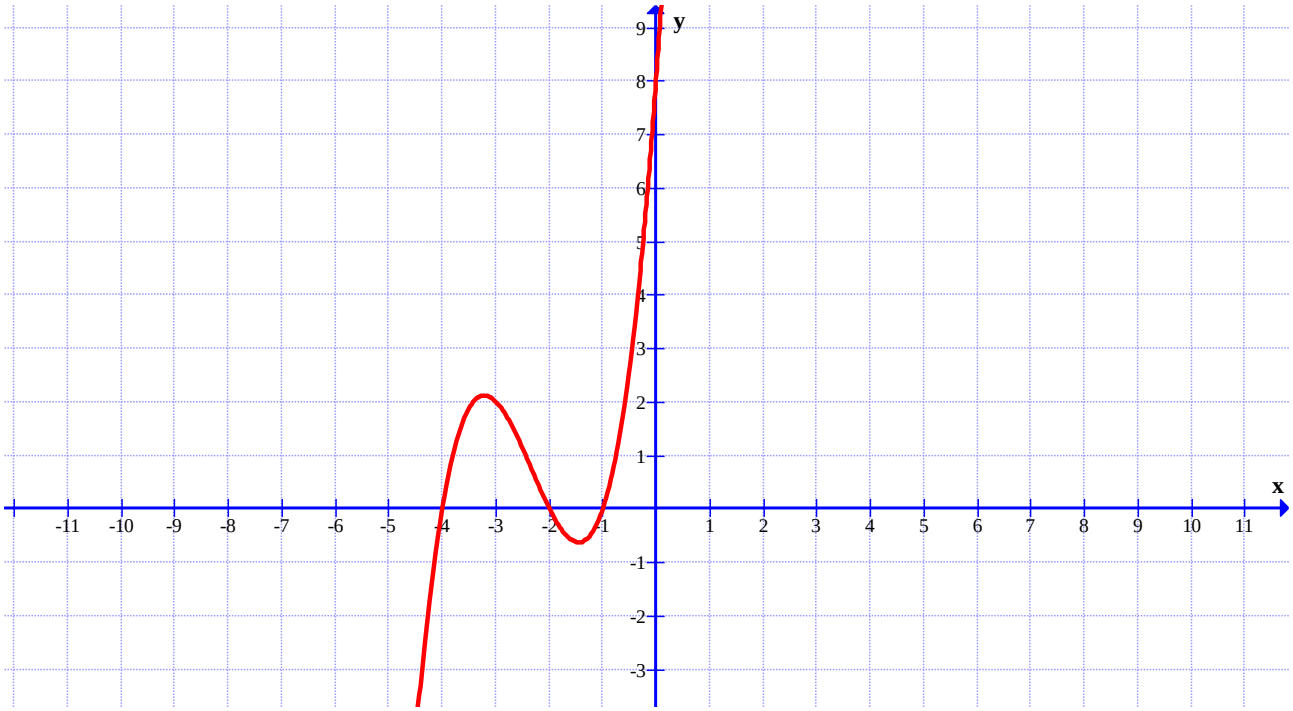
b) $-2x^5-12x^4-16x^3+12x^2+18x\ge 0$

c) $-3x^3-11x^2-5x+3>0$

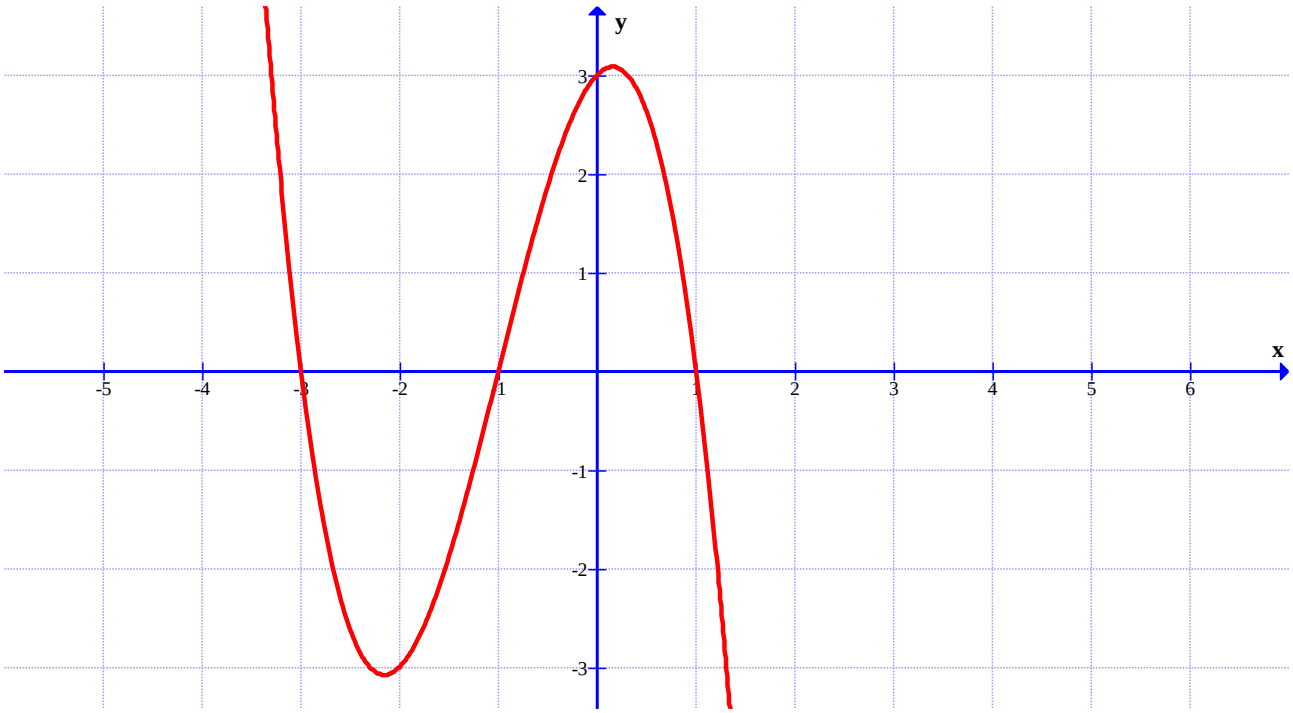
d) $3x^5+5x^4-7x^3-9x^2+4x+4\ge 0$

REŠITVE UČNEGA LISTA – Polinomi – 2

1) a) $a=-10$
   b) $a=-4$
2) a) $a=1,\ b=7$
   b) $a=-5,\ b=8$
3) $a=0,\ b=-7$
4) $x_1=-4,\ x_2=-\frac{1}{4},\ x_3=\frac{2}{3},\ x_4=\frac{3}{2}$
5) $x_1=1,\ x_2=-1,\ x_3=-4$
6) $p(x)=-6x^3-9x^2+9x+6$
7) $p(x)=3x^3-7x^2-7x+3$
8) $p(x)=2x^4-10x^2+8$
9) $p(x)=6x^5+11x^4-33x^3-33x^2+11x+6$
10) a) $P_1(3,5),\ P_2(-2,-10)$
    b) $P_1(1,10),\ P_2(-1,2),\ P_3\left(-\frac{1}{2},4\right)$
11) a) $P_1(1,9),\ P_2(-3,17),\ P_3\left(-\frac{1}{3},\frac{41}{9}\right)$
    b) $P_1(-1,6),\ P_2(2,33),\ P_3\left(-\frac{1}{2},\frac{17}{4}\right)$
12) a) N: $x_1=-1,\ x_2=-2,\ x_3=-4,\ p(0)=8$

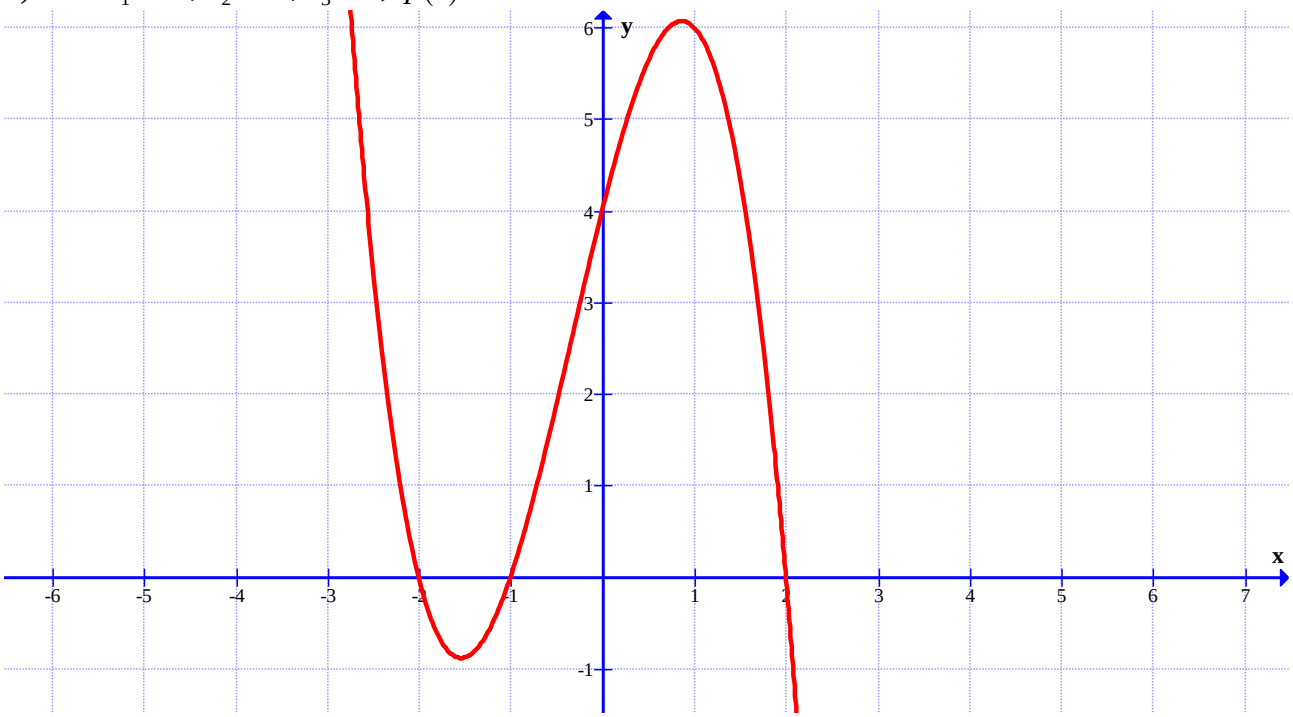


b) N: $x_1 = -1,\ x_2 = 1,\ x_3 = -3,\ p(0) = 3$

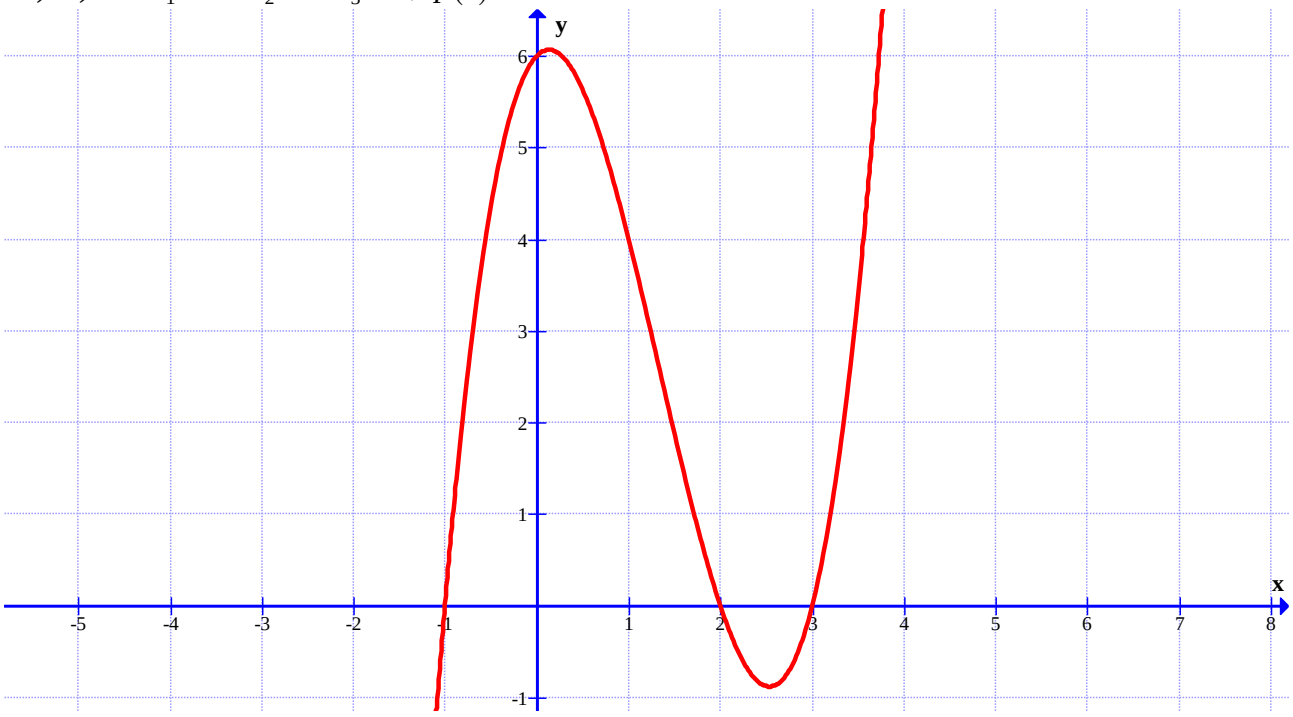


c) N: $x_1 = -3,\ x_{2,3} = 2,\ p(0) = 12$

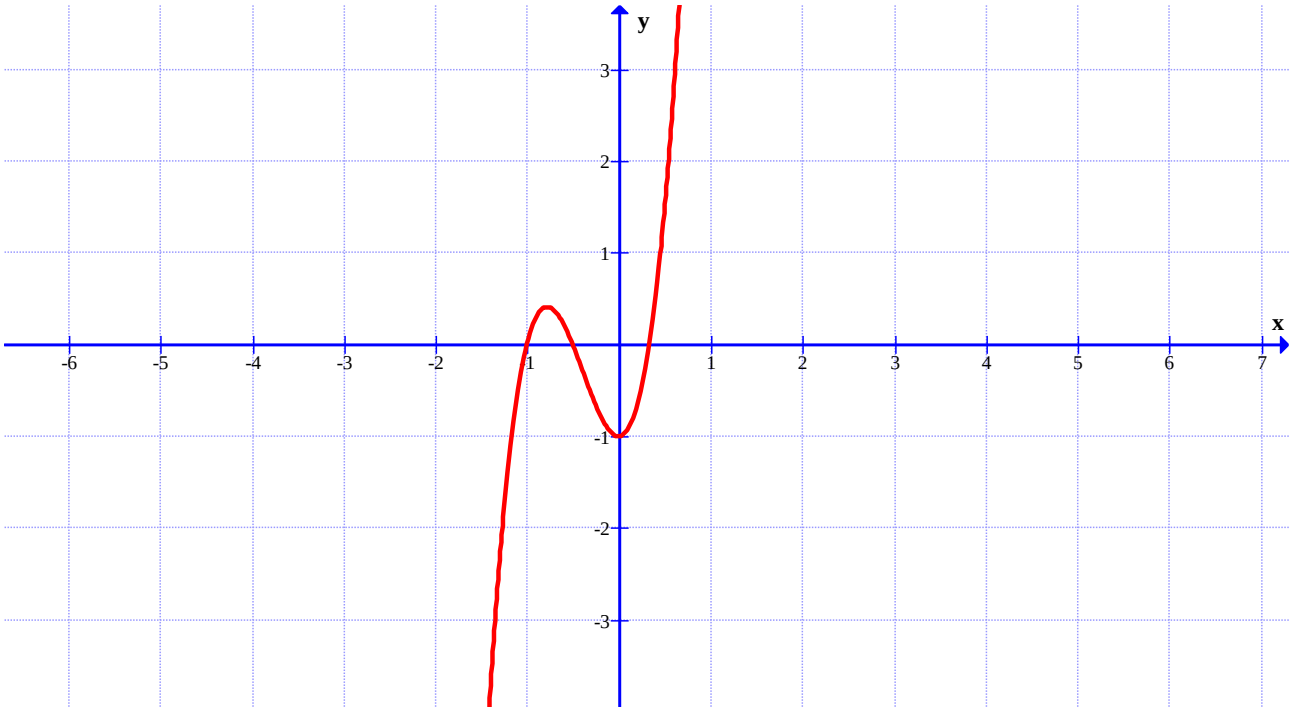
d) N: $x_1 = -2,\ x_2 = -1,\ x_3 = 2,\ p(0) = 4$



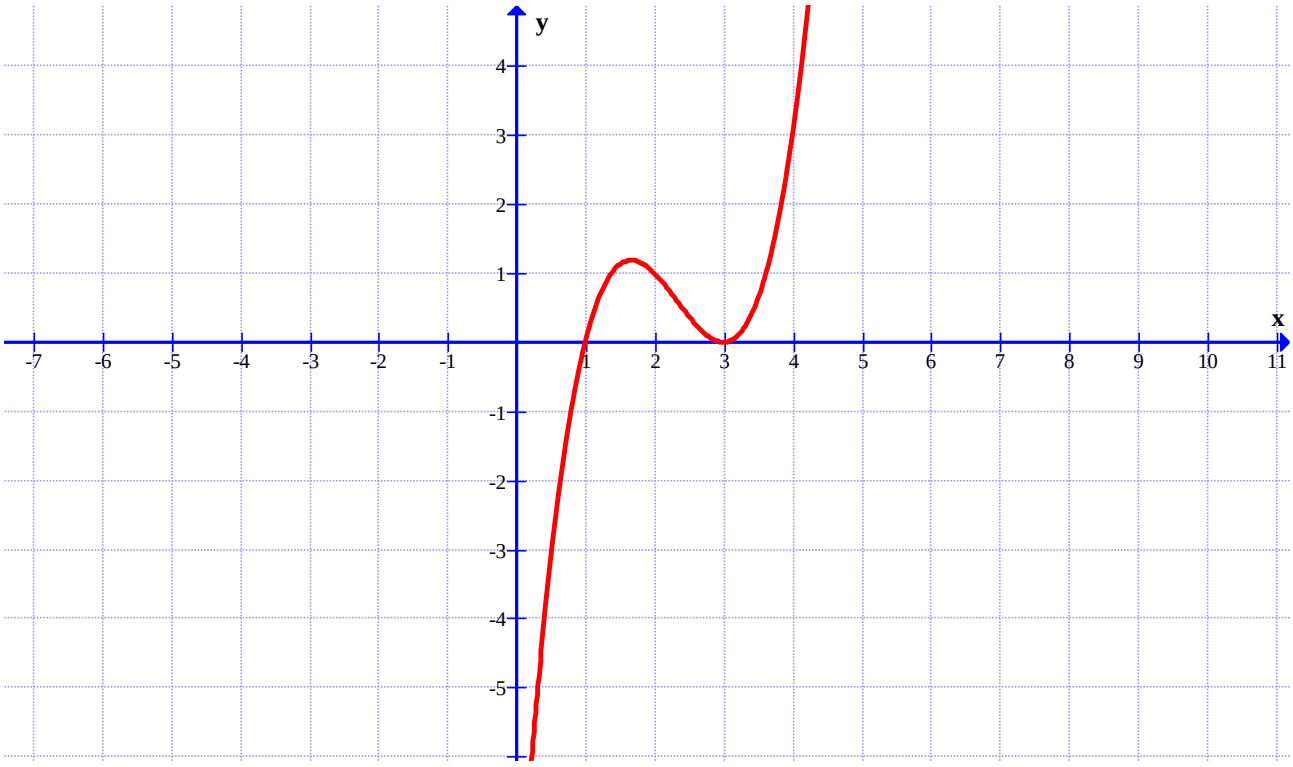
13) a) N: $x_1 = -1,\ x_2 = 2,\ x_3 = 3,\ p(0) = 6$



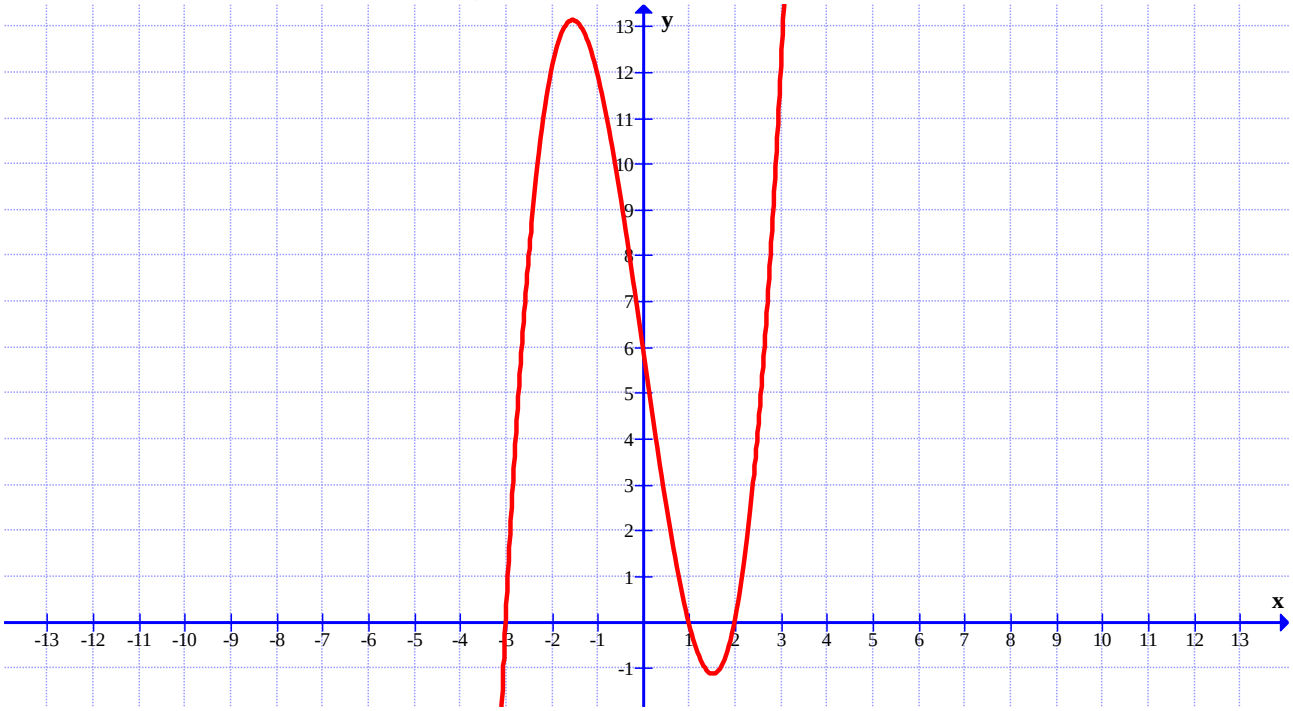
b) N: $x_1 = -1,\ x_2 = -\frac{1}{2},\ x_3 = \frac{1}{3},\ p(0) = -1$



c) N: $x_1 = 1,\ x_{2,3} = 3,\ p(0) = -9$



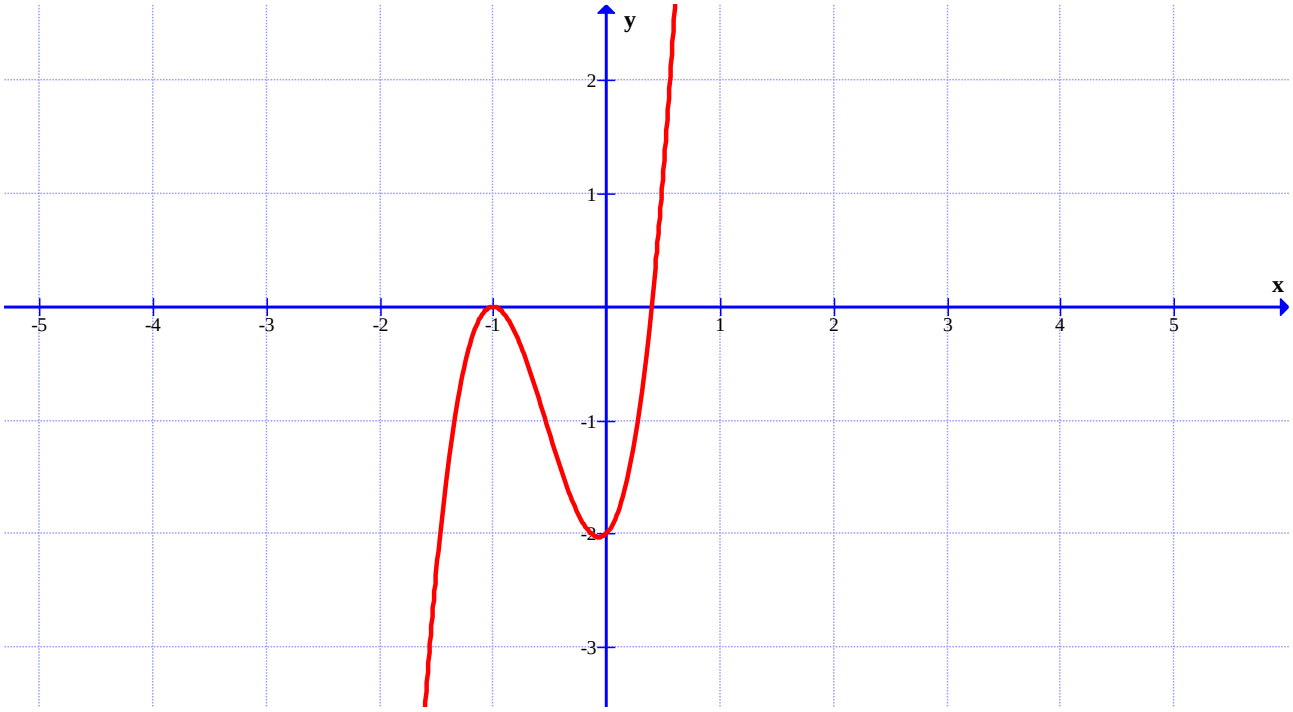
d) N: $x_1 = -3,\ x_2 = 1,\ x_3 = 2,\ p(0) = 6$



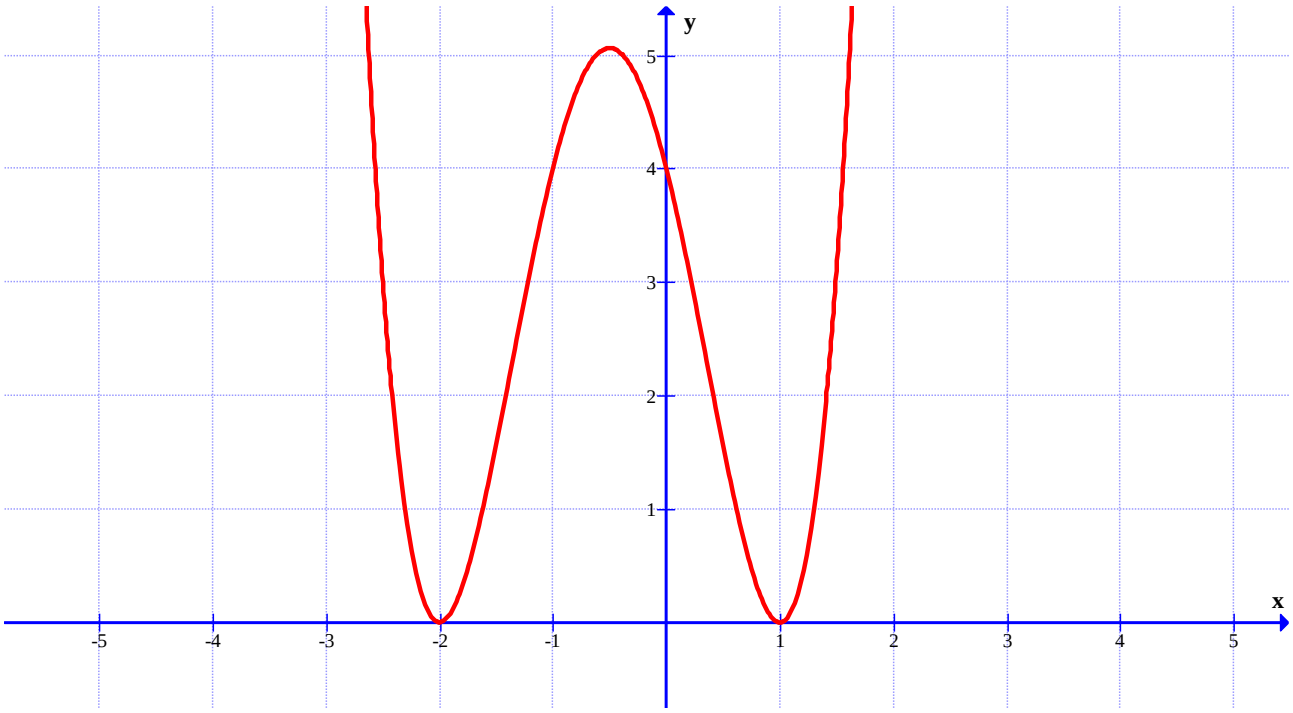
14) $x_1 = 0,\ x_{2,3} = -1,\ x_4 = \frac{1}{2},\ x_{5,6} = -\frac{2}{5}$

15) a) $N: x_1 = -1, x_2 = -2,\ x_3 = -3,\ p(0) = 6$

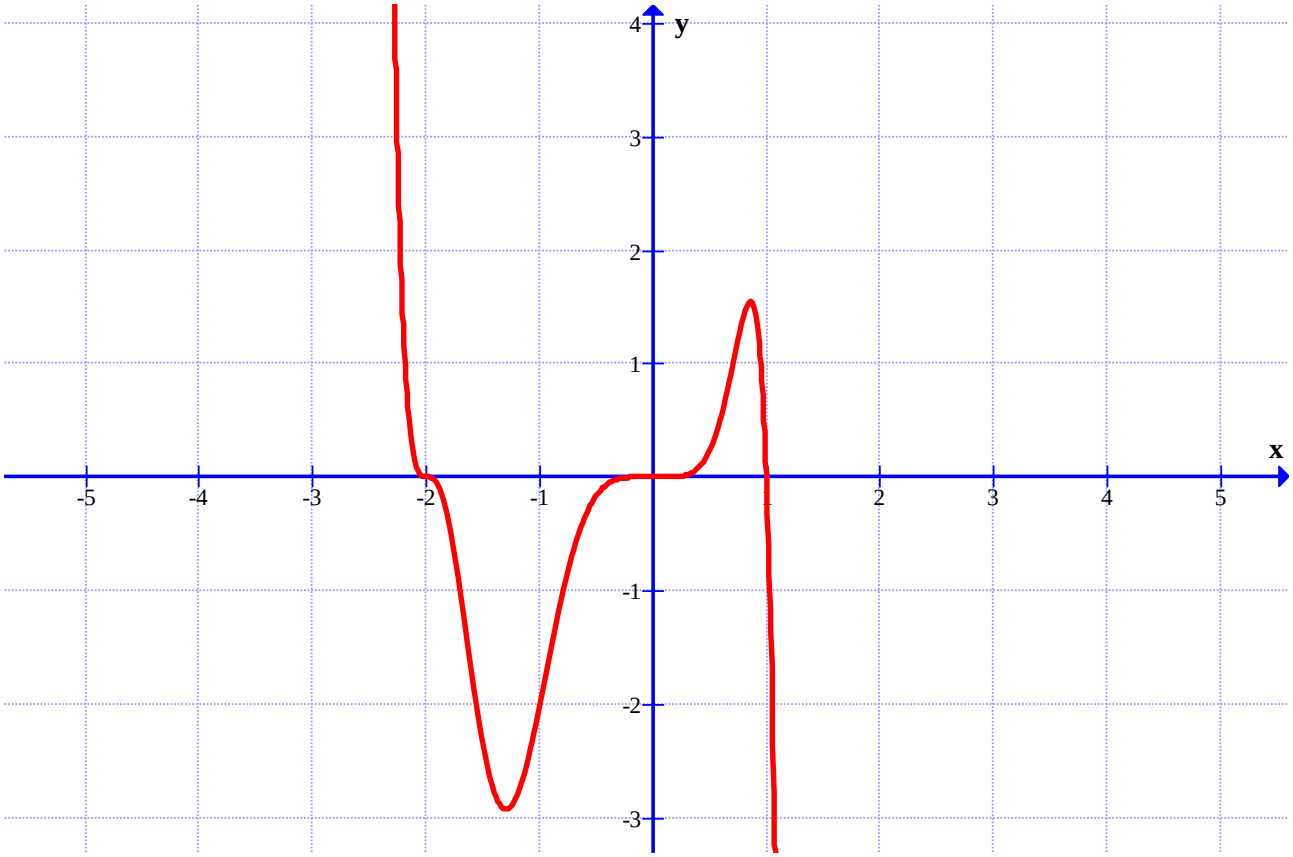
b) $N: x_{1,2} = -1, x_3 = \frac{2}{5}, p(0) = -2$



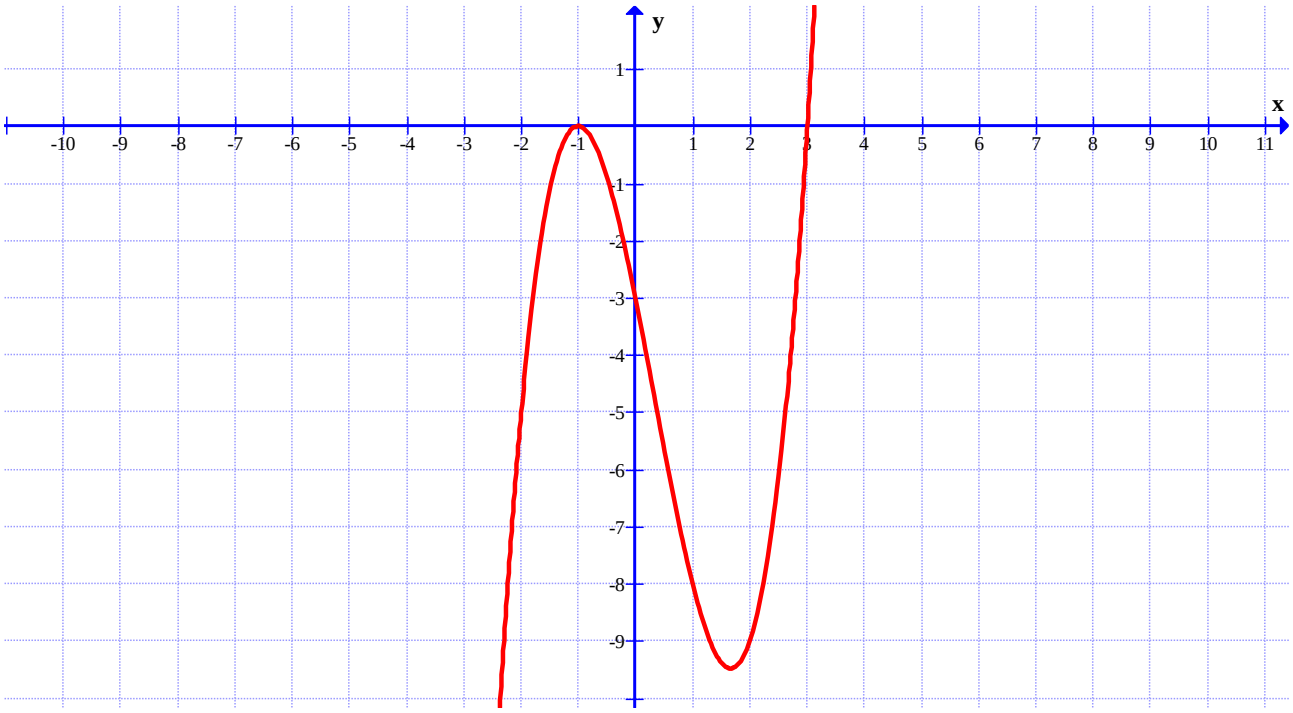
c) $N: x_{1,2} = 1, x_{3,4} = -2,\ p(0) = 4$



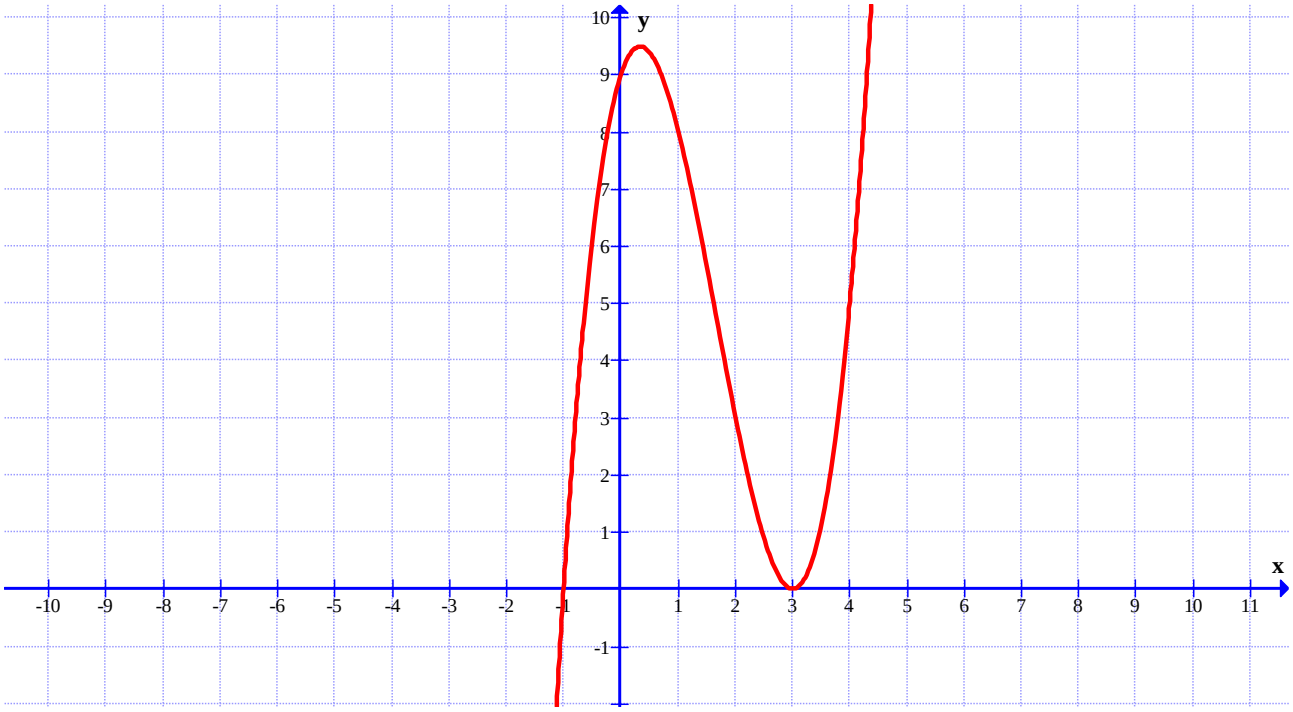
d) $N: x_{1,2,3,4,5}=0, x_6=1,\ x_{7,8,9}=-2, p(0)=0$



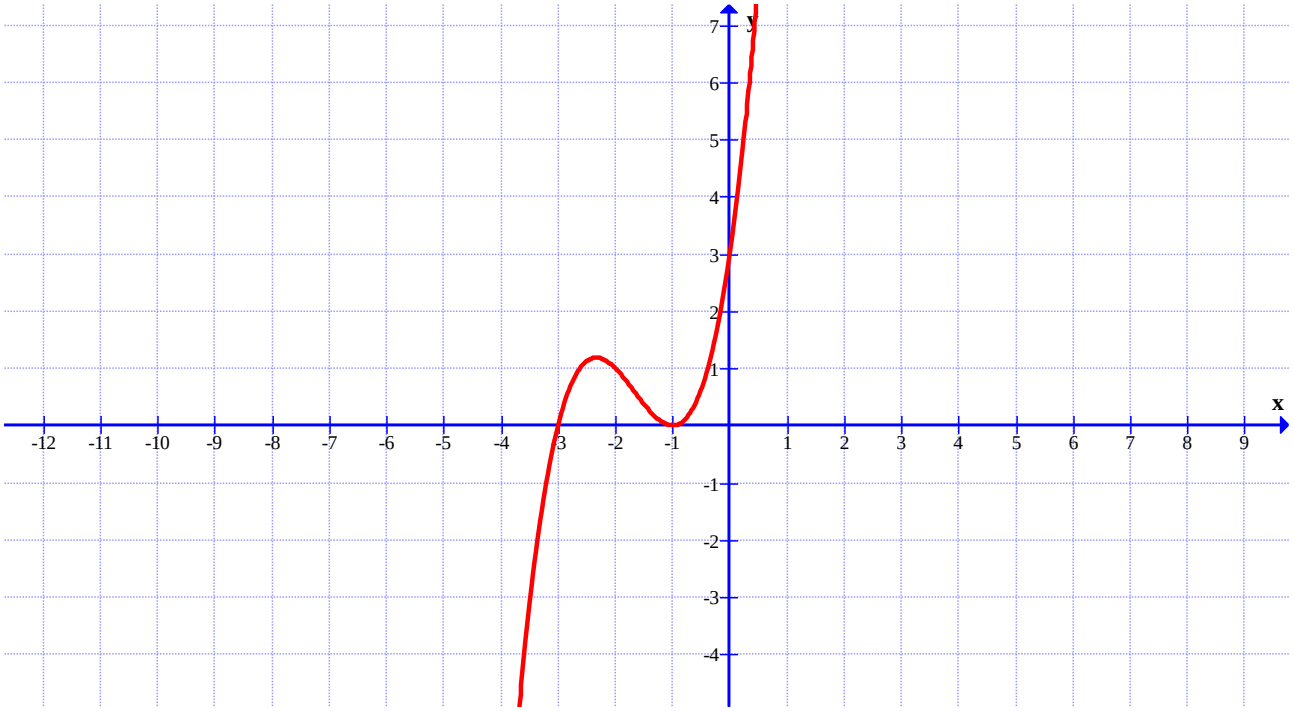
16) a) N: $x_{1,2}=-1,\ x_3=3,\ p(0)=-3$



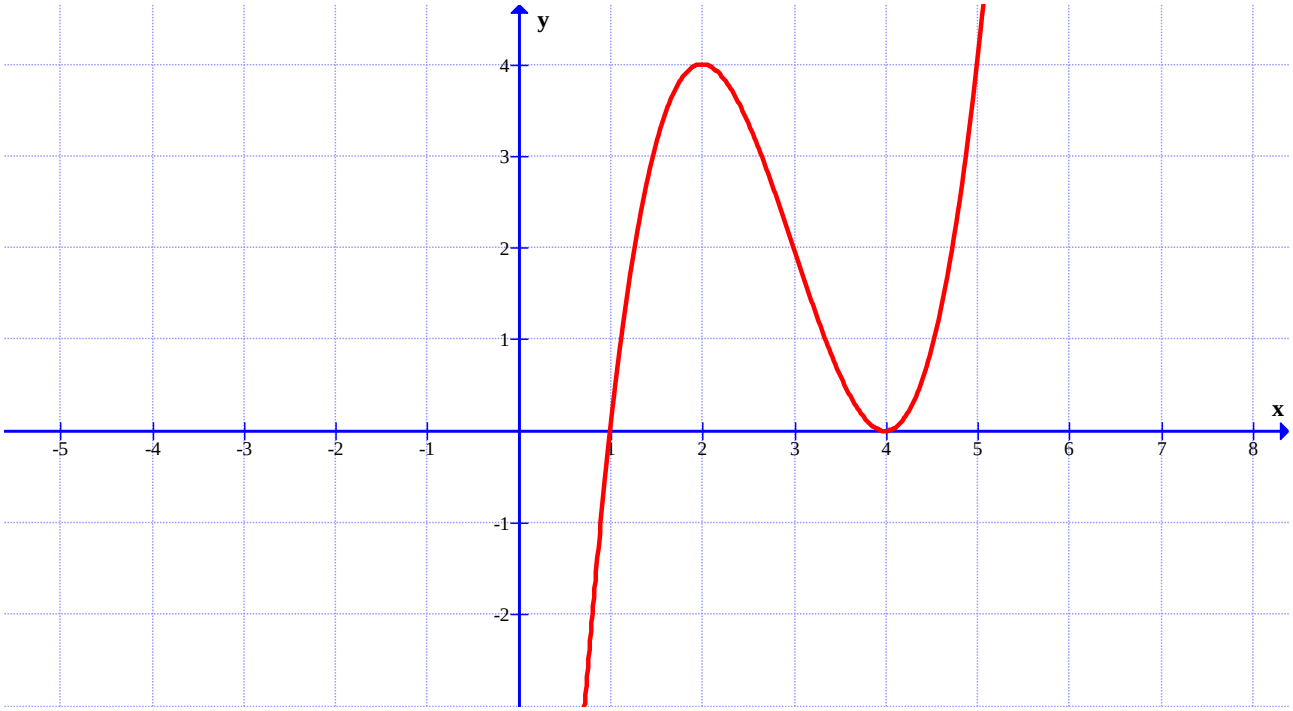
b) N: $x_1 = -1,\ x_{2,3} = 3,\ p(0) = 9$



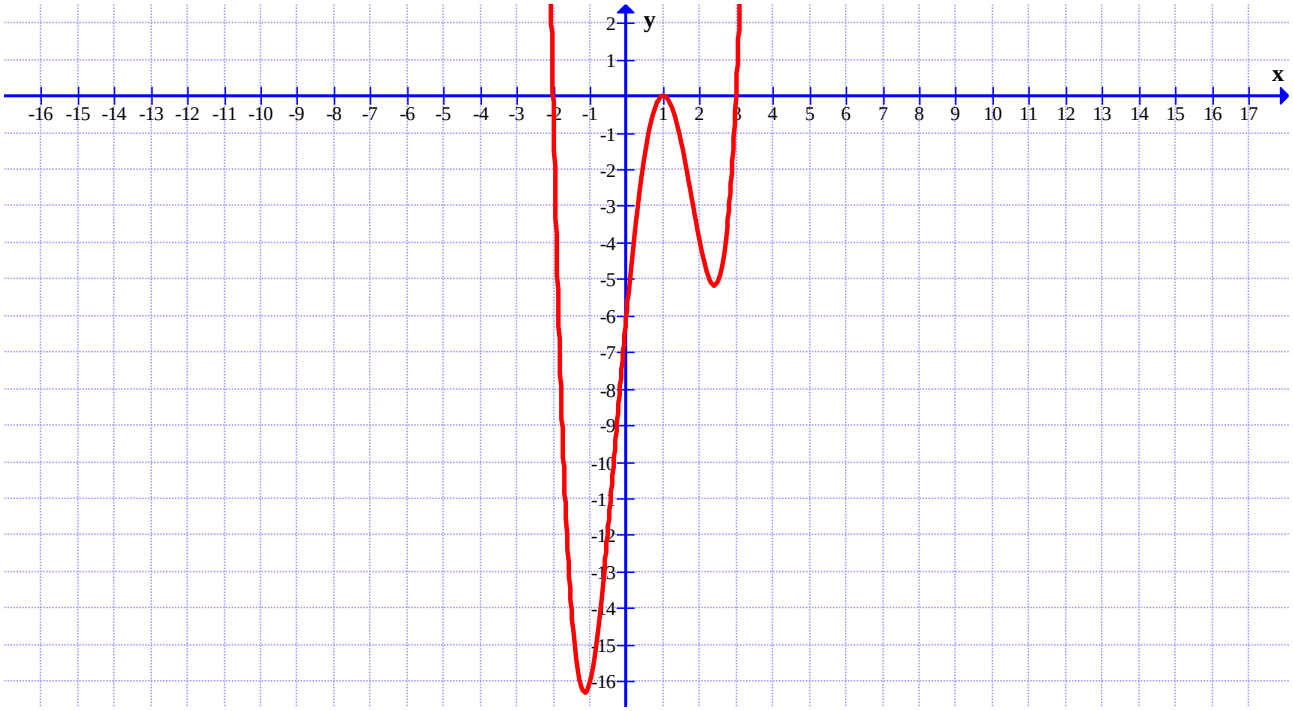
c) N: $x_{1,2} = -1,\ x_3 = -3,\ p(0) = 3$



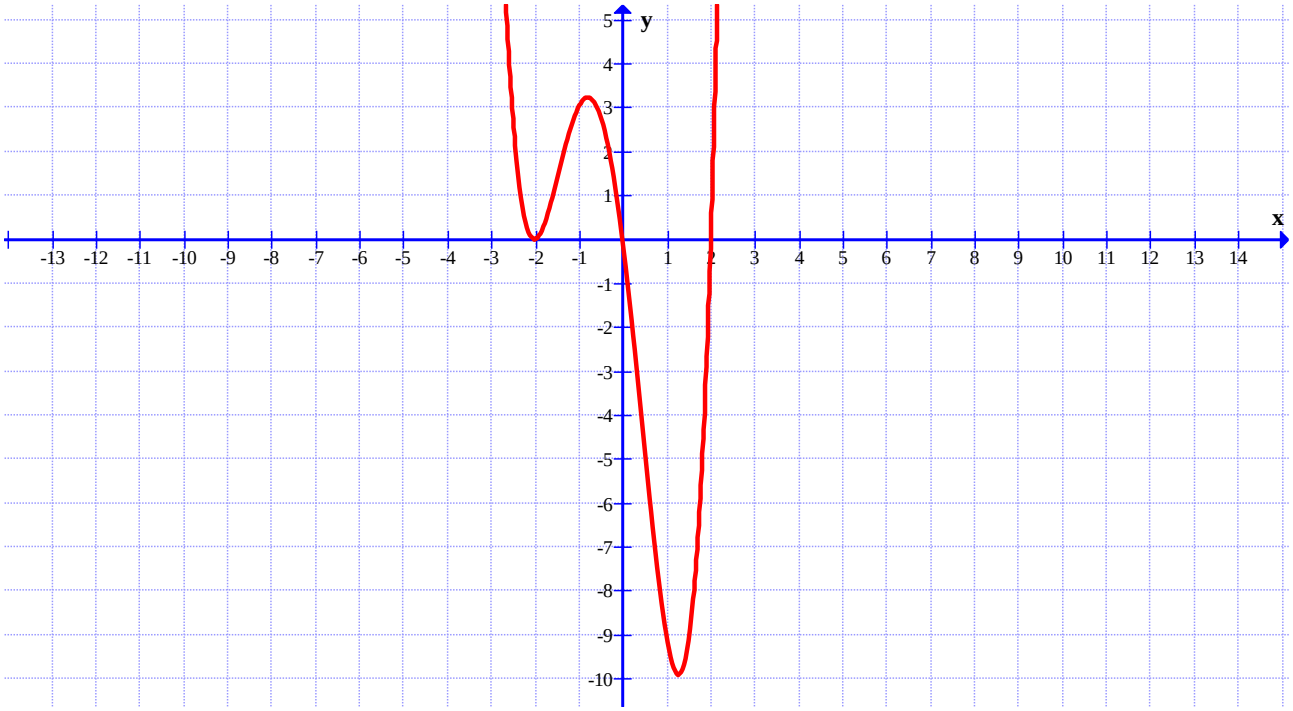
d) N: $x_1 = 1,\ x_{2,3} = 4,\ p(0) = -16$



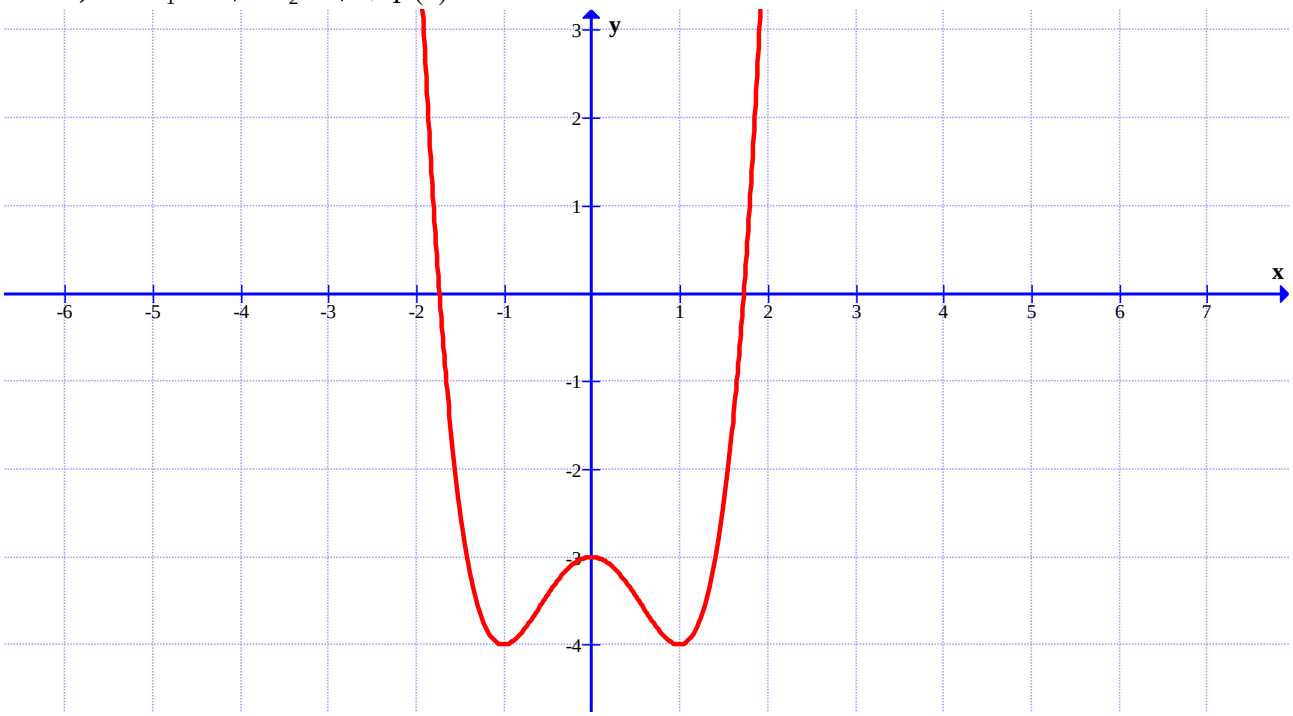
17) a) N: $x_1 = -2,\ x_{2,3} = 1,\ x_4 = 3,\ p(0) = -6$



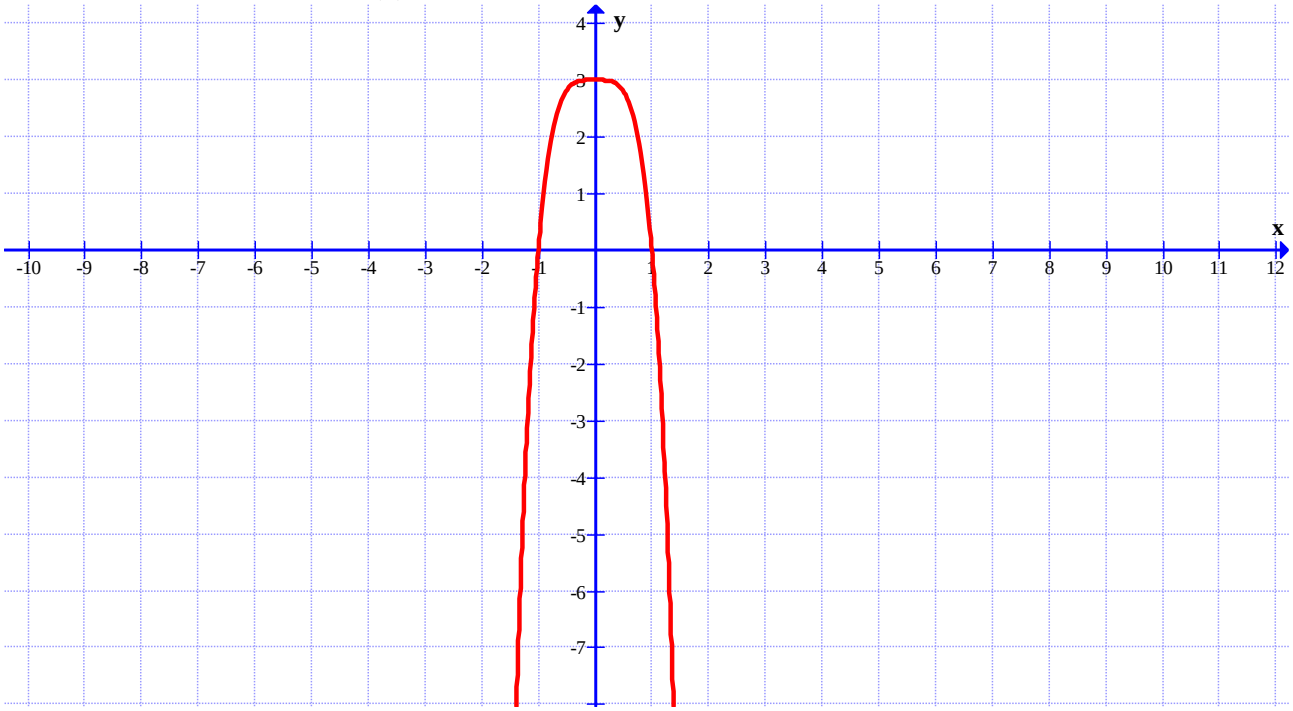
b) N: $x_{1,2}=-2,\ x_3=0,\ x_4=2,\ p(0)=0$



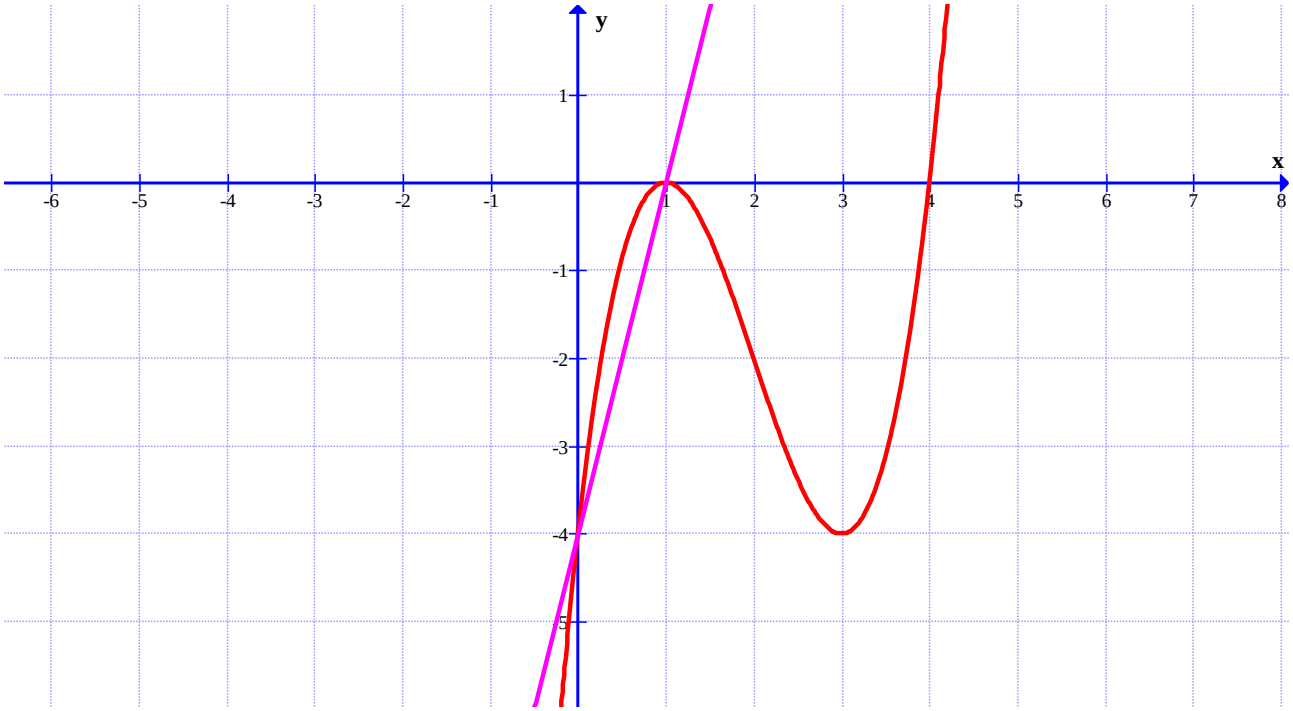
c) N: $x_1=-\sqrt{3},\ x_2=\sqrt{3},\ p(0)=-3$



d) $N: x_1 = -1, x_2 = 1,\ p(0) = 3$



18) $x_{1,2} = 1,\ x_3 = 4,\ P_1(0,-4),\ P_2(1,0),\ P_3(5,16)$



19) a)

$N:\ x_1 = -2,\ x_2 = \frac{1}{2},\ x_3 = 2;\quad f(0) = 4$

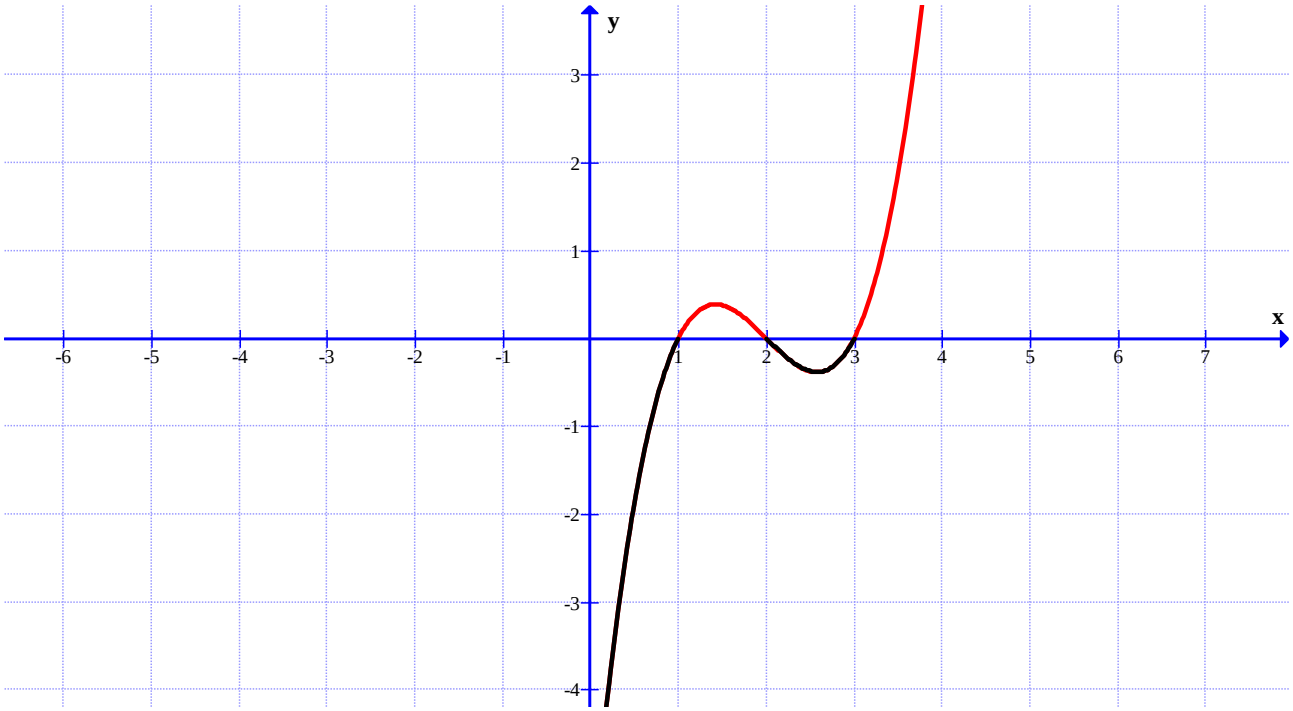
$A(-1,9);\quad p(x) = 2x^3 - x^2 - 8x + 4$

b)

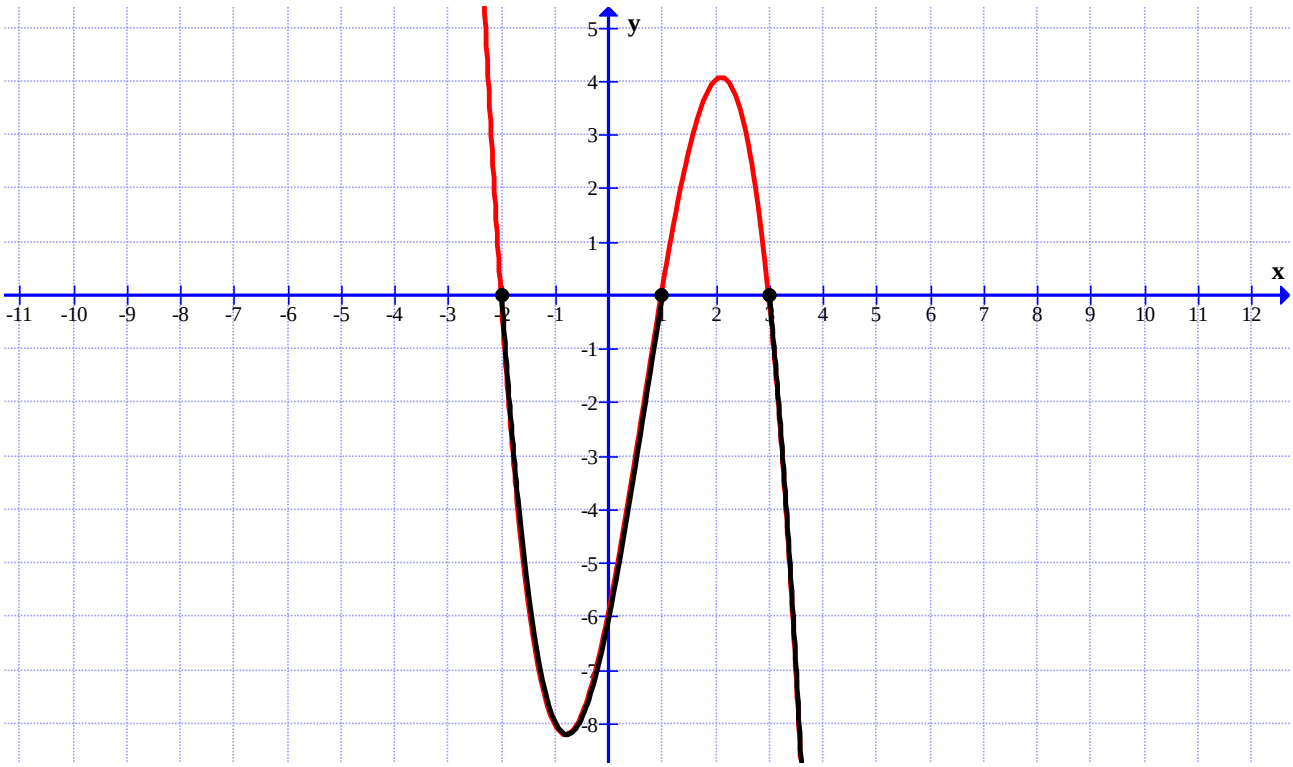
$N:\ x_{1,2} = -1,\ x_3 = \frac{3}{2},\ x_4 = 2;\quad f(0) = -6$

$B(1,-4);\quad p(x) = -2x^4 + 3x^3 + 6x^2 - 5x - 6$

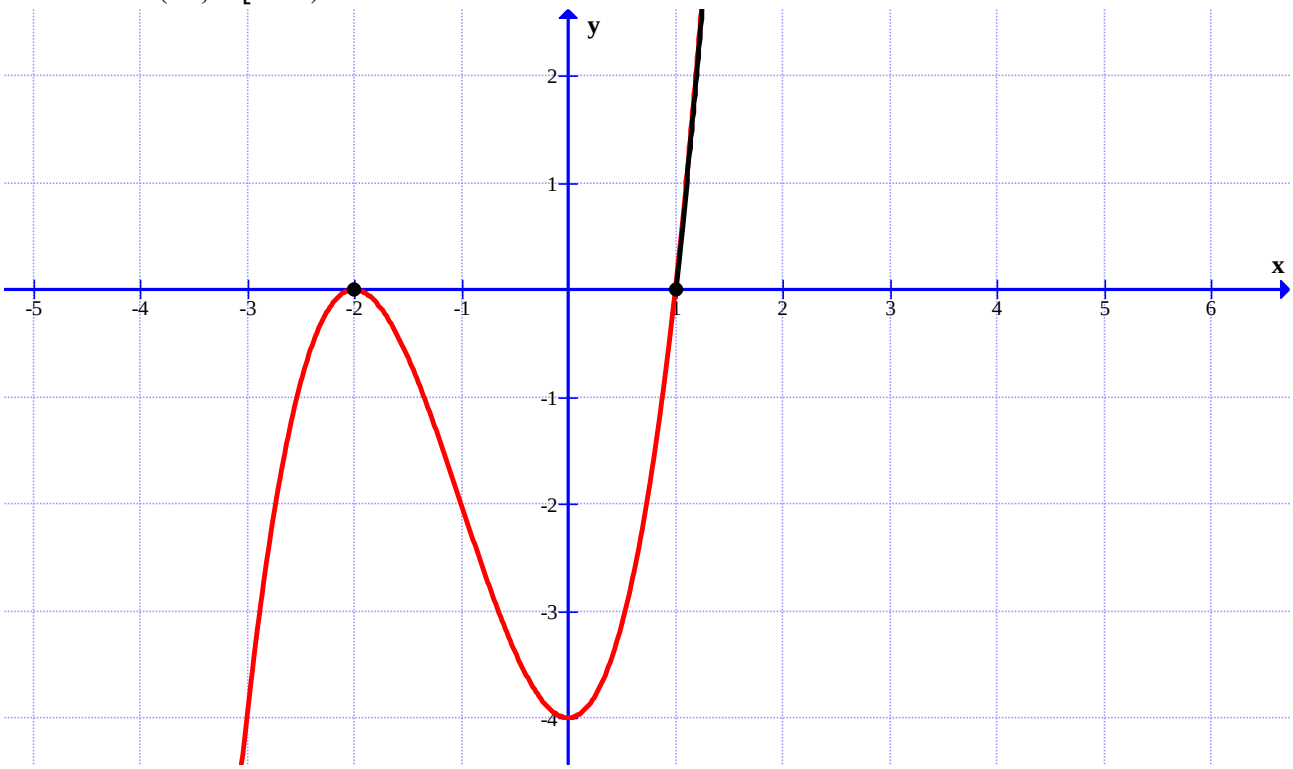
20) a) $x \in (-\infty,1) \cup (2,3)$



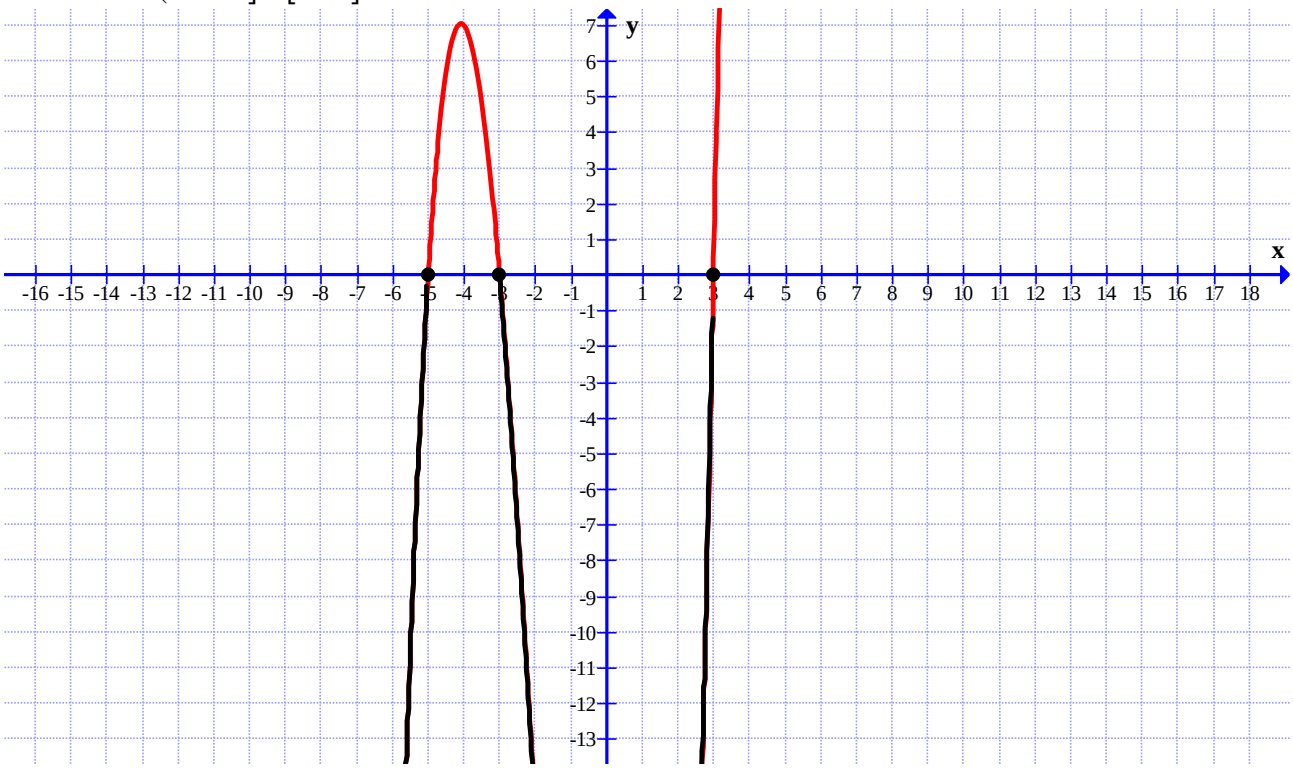
b) $x \in [-2,1] \cup [3,+\infty)$



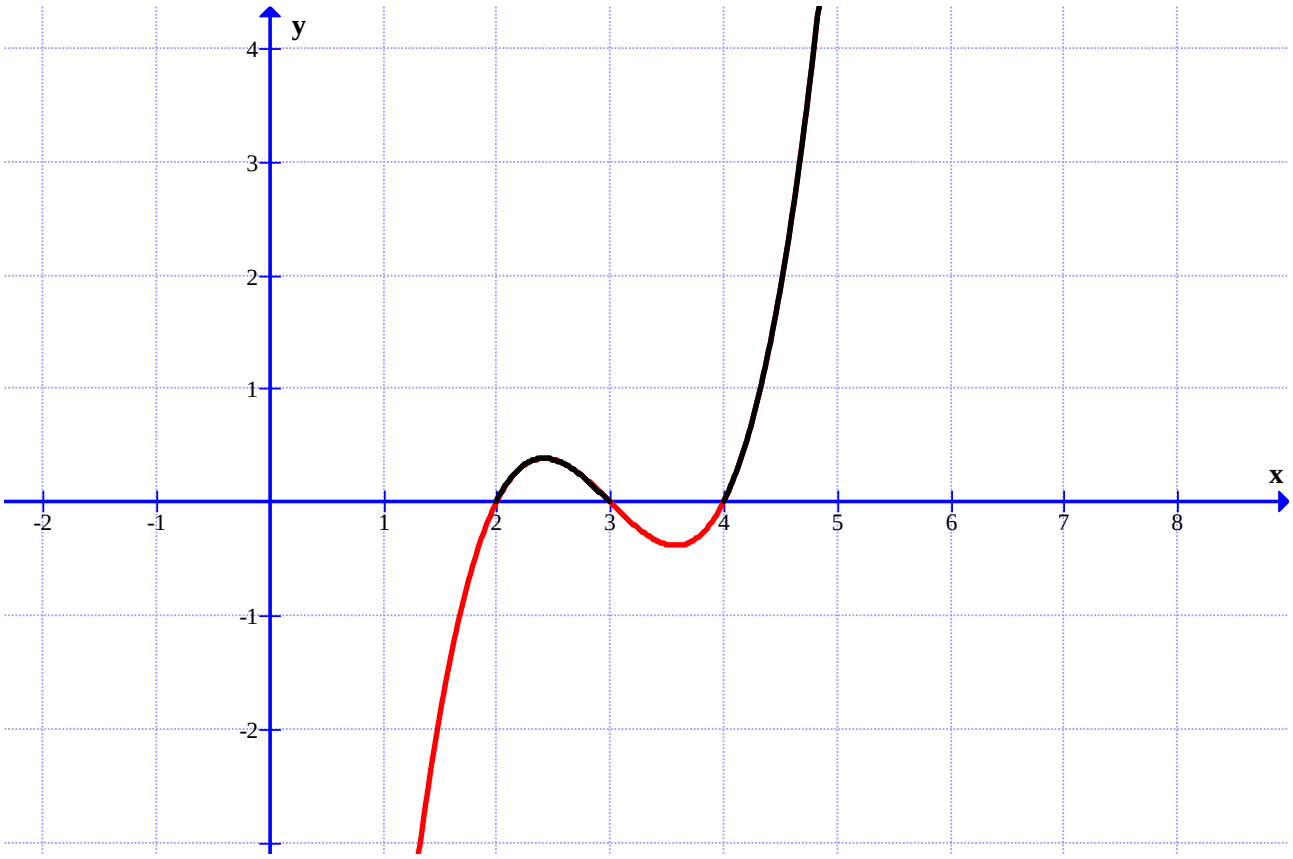
c) $x \in \{-2\} \cup [1, +\infty)$



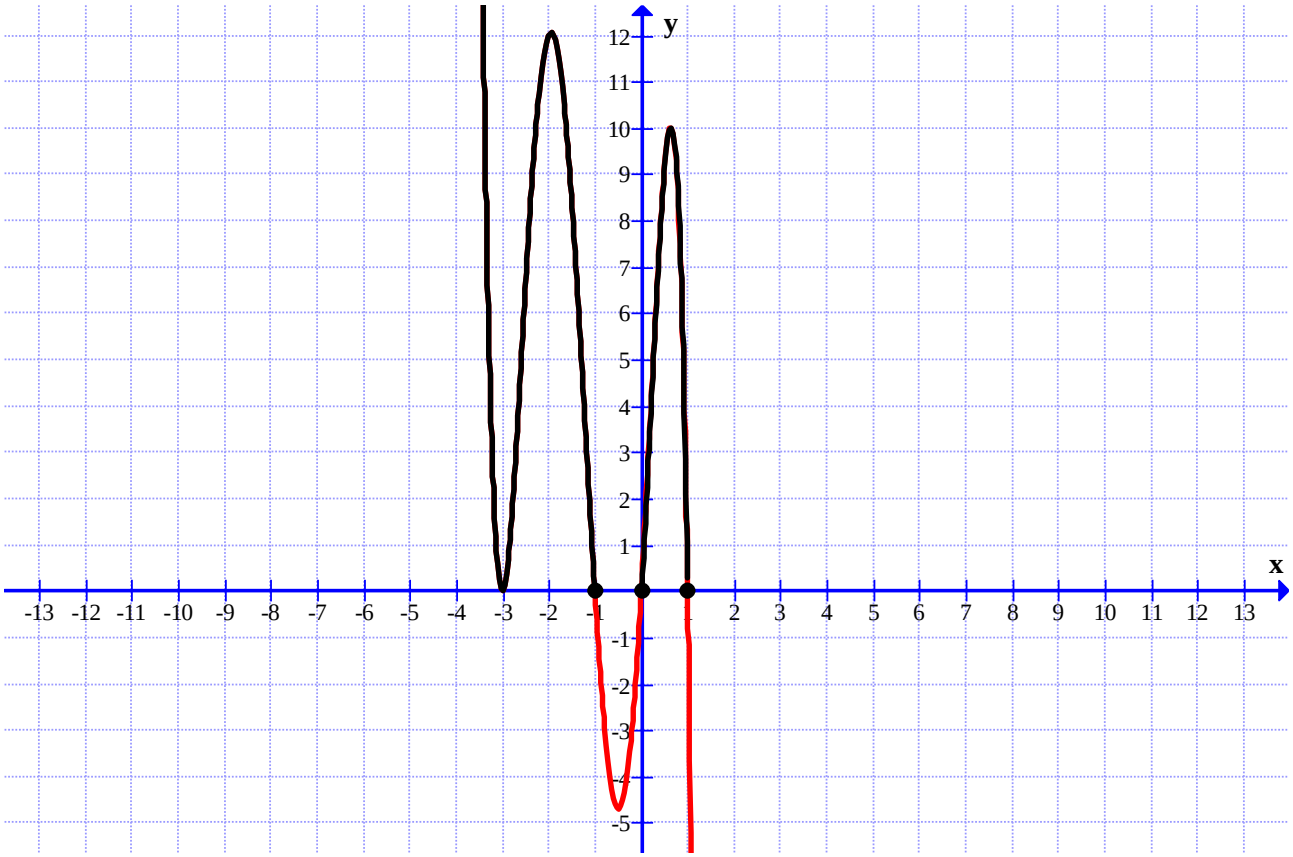
d) $x \in (-\infty, -5] \cup [-3, 3]$



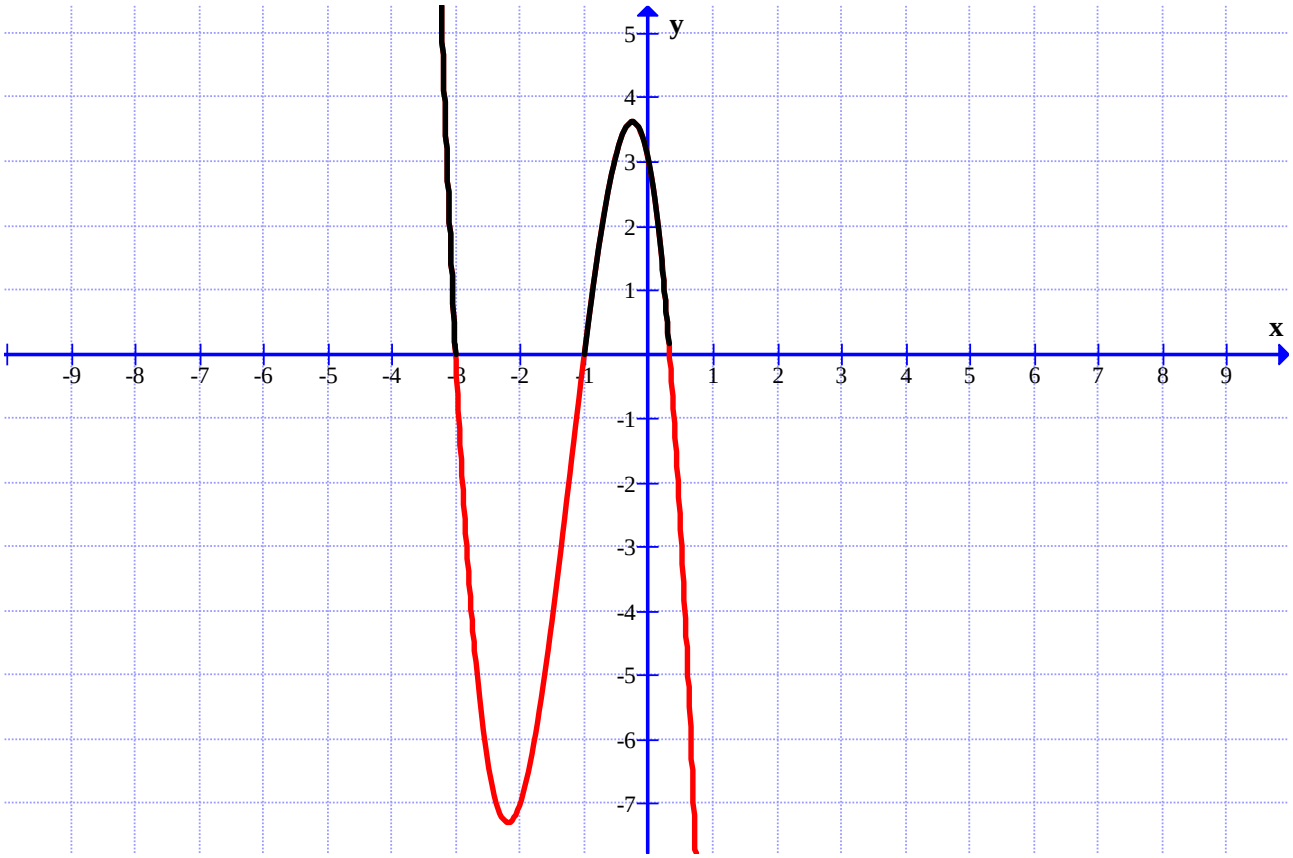
21) a) $x \in (2,3) \cup (4,\infty)$



b) $x \in (-\infty,-1] \cup [0.1]$



c) $(-\infty,-3)\cup(-1,\frac{1}{3})$



d) $[-2,-1]\cup[-\frac{2}{3},\infty)$