

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) $p(x) = x^4 - 3x^3 + ax^2 + bx - 30$, $x_1 = -2$ in $x_2 = 3$
 - b) $p(x) = x^3 + (a + 1)x^2 + x + (b - 2)$, $x_1 = 2$ 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:
 $3^{x^3 + 4x^2 - x - 7} = 0,037$
- 6) Poišči polinom tretje stopnje z vodilnim koeficientom -6 in ničlami $x_1 = 1$, $x_2 = -\frac{1}{2}$ in $x_3 = -2$.
- 7) Poišči polinom 3. stopnje z ničlami $x_1 = -1$, $x_2 = \frac{1}{3}$ in $x_3 = 3$, če gre njegov graf skozi točko $A(1, -8)$.
- 8) Poišči polinom četrte stopnje z ničlami $x_1 = -2$, $x_2 = -1$, $x_3 = 1$ in $x_4 = 2$, če gre njegov graf skozi točko $A(0, 8)$.
- 9) Poišči simetrični polinom pete stopnje, ki ima ničli $x_1 = -3$ 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 $p(x) = x \cdot (x + 1)^2 \cdot (2x - 1) \cdot (5x + 2)^2$.
- 15) Zapiši ničle, začetno vrednost in nariši graf polinoma:

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

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

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

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

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

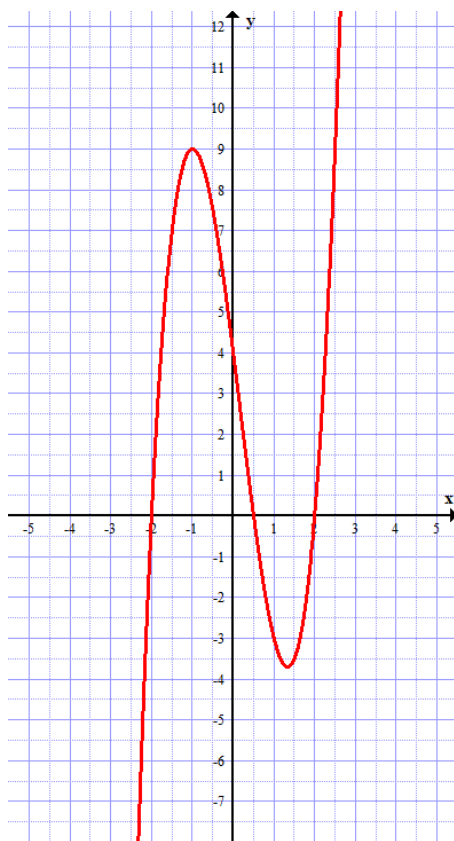
b) $p(x) = -x^4 - 2x^3 + 4x^2 + 8x$

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

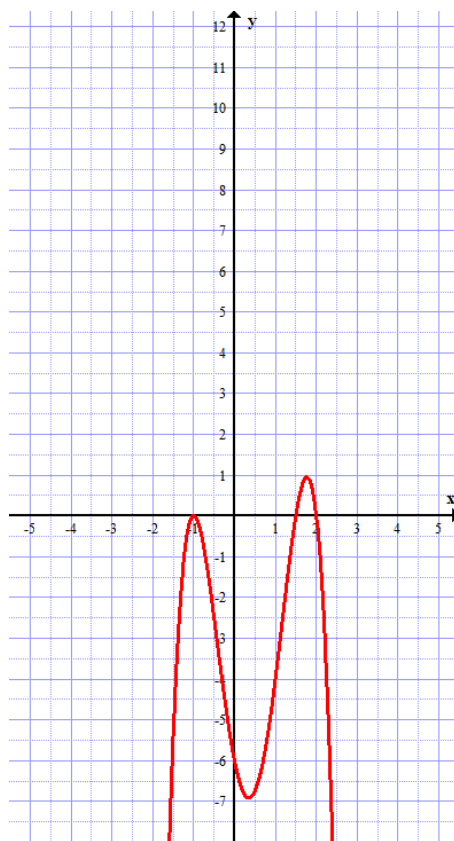
d) $p(x) = -3x^4 + 3$

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 določi, kje ima ničle in kolikšna je začetna vrednost. Kolikšna je vrednost polinoma pri $x = 1$? Zapiši še enačbo tega polinoma.



20) Reši neenačbe:

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

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

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

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

21) Reši neenačbe:

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

b) $-3x^3 - 11x^2 - 5x + 3 < 0$

c) $3x^5 + 5x^4 - 7x^3 - 9x^2 + 4x + 4 \geq 0$

d) $-2x^5 - 12x^4 - 16x^3 + 12x^2 + 18x \geq 0$

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) $p(x) = 6x^5 + 11x^4 - 33x^3 - 33x^2 + 11x + 6$

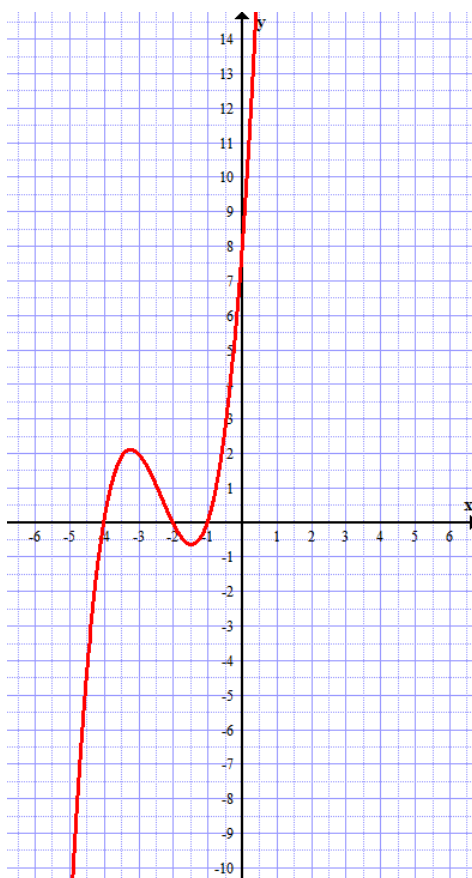
10) a) $P_1(3, 5), P_2(-2, -10)$

b) $P_1(1, 10), P_2(-1, 2), P_3(-\frac{1}{2}, 4)$

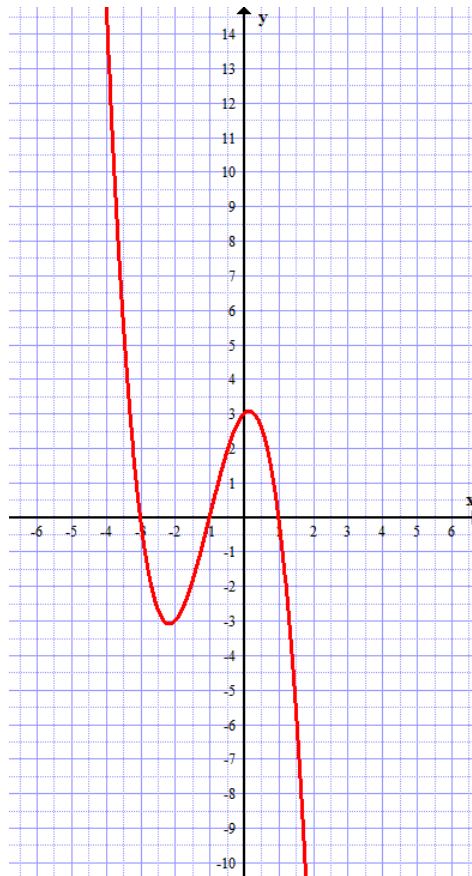
11) a) $P_1(1, 9), P_2(-3, 17), P_3(-\frac{1}{3}, \frac{41}{9})$

b) $P_1(-1, 6), P_2(2, 33), P_3(-\frac{1}{2}, \frac{17}{4})$

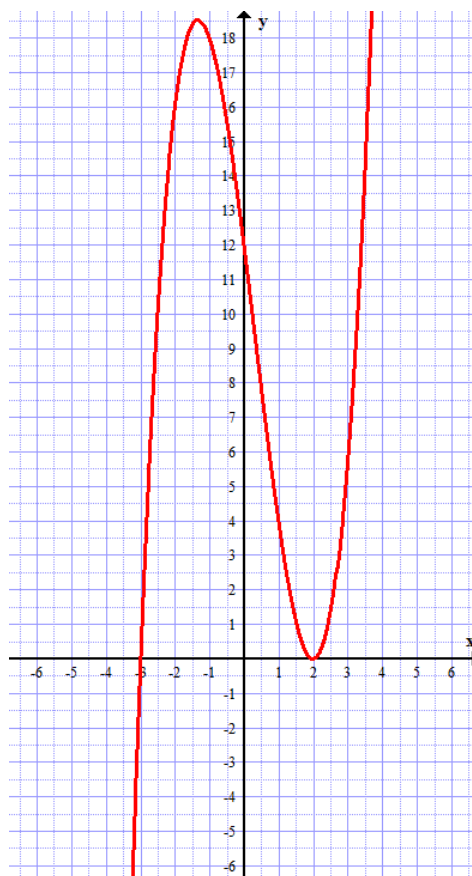
12) a) $N: x_1 = -1, x_2 = -2, x_3 = -4, p(0) = 8$



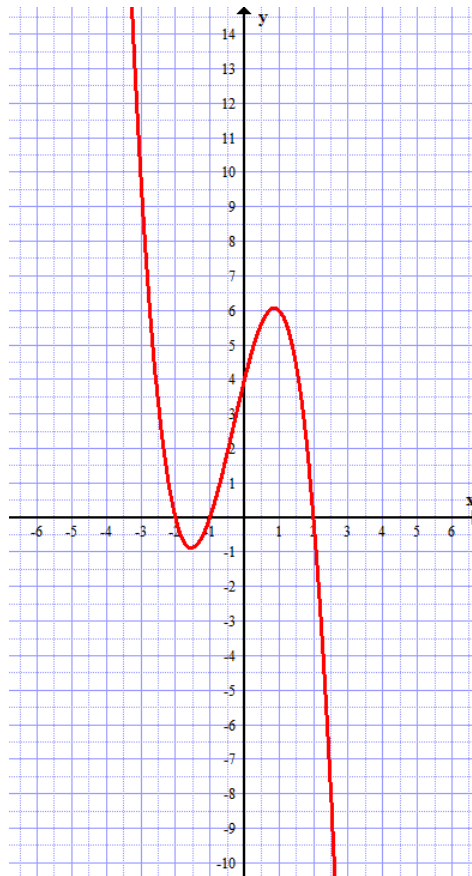
b) $N: x_1 = -1, x_2 = 1, x_3 = -3, p(0) = 3$



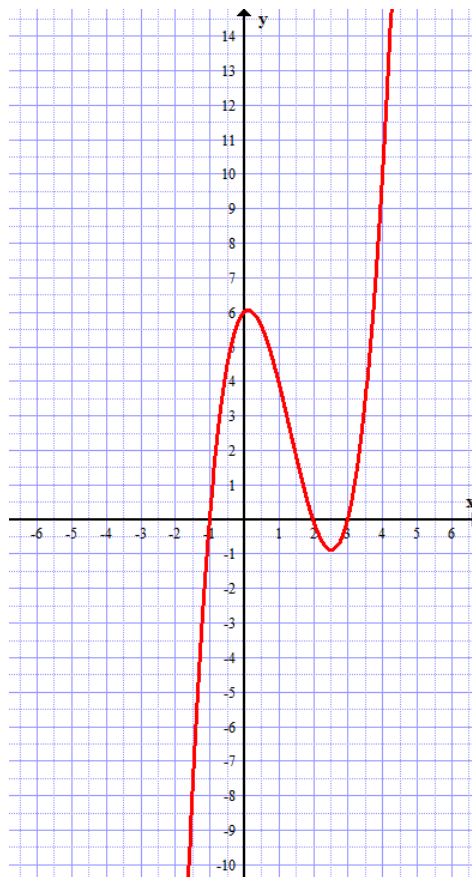
c) $N: x_1 = -3, x_{2,3} = 2, p(0) = 12$



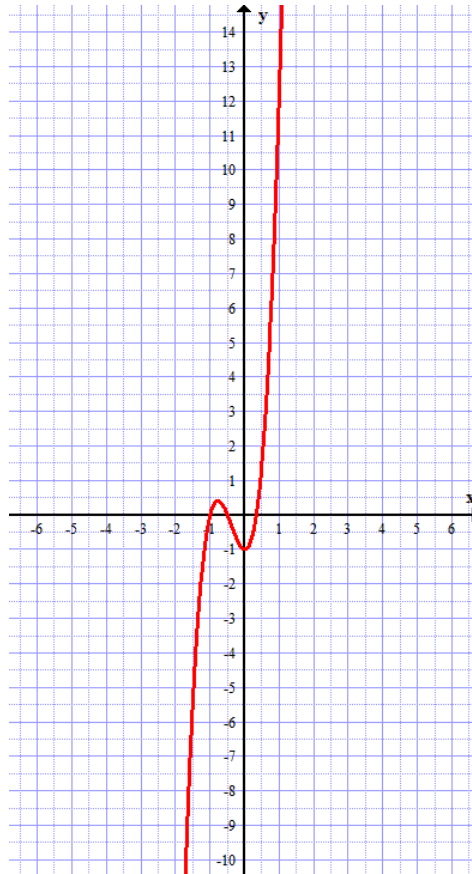
d) $N: x_1 = -2, x_2 = -1, x_3 = 2, p(0) = 4$



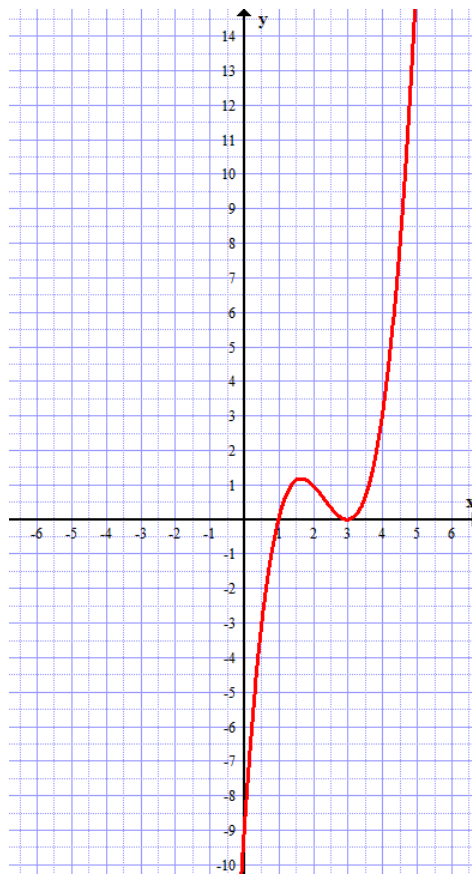
13) a) $N: x_1 = -1, x_2 = 2, x_3 = 3, p(0) = 6$



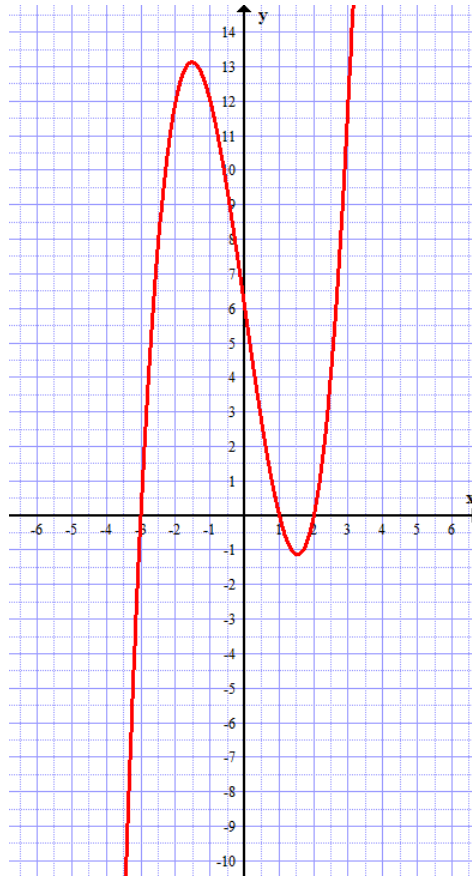
b) $N: x_1 = -1, x_2 = -\frac{1}{2}, x_3 = \frac{1}{3}, p(0) = -1$



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

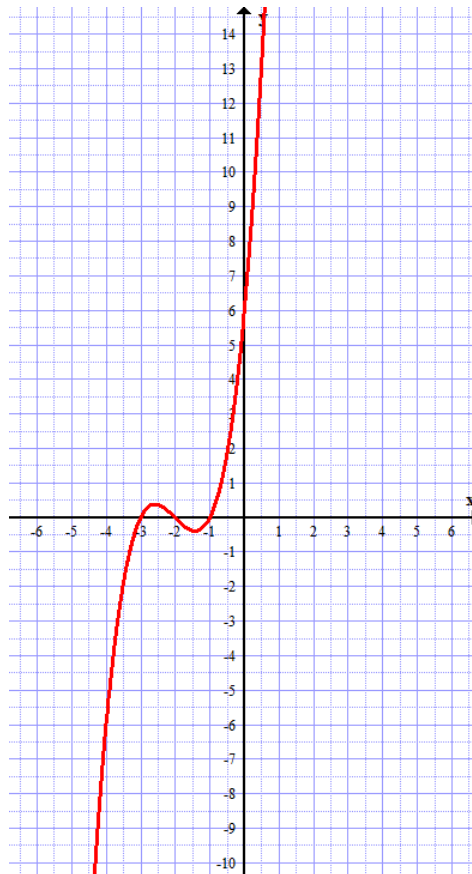


d) $N: x_1 = -3, x_2 = 1, x_3 = 2, p(0) = 6$

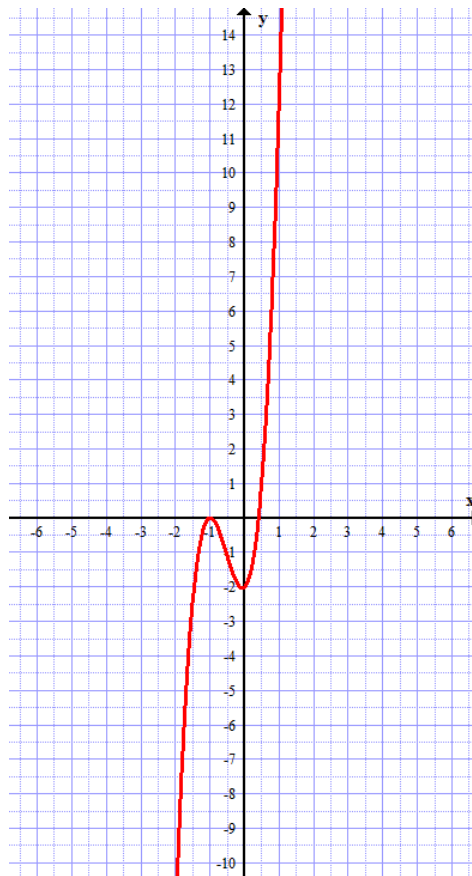


14) $x_1 = 0, x_{2,3} = -1, x_4 = \frac{1}{2}, x_{5,6} = -\frac{2}{5}$

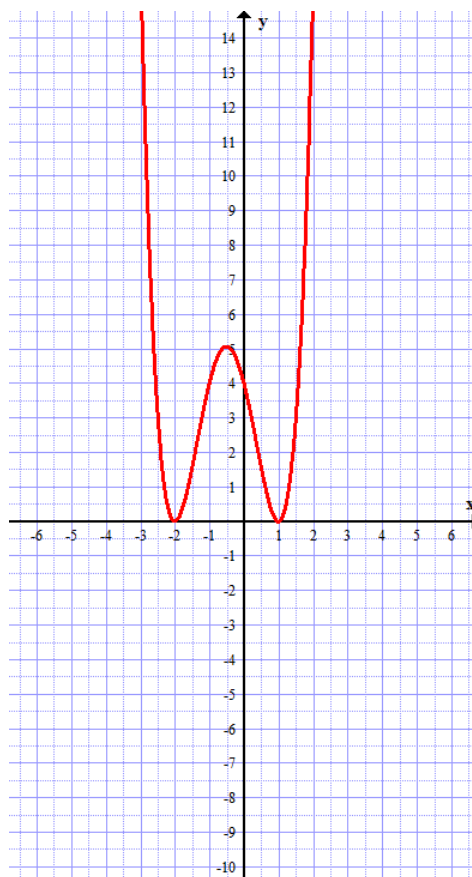
15) a) $N: x_1 = -1, x_2 = -2, x_3 = -3, p(0) = 6$



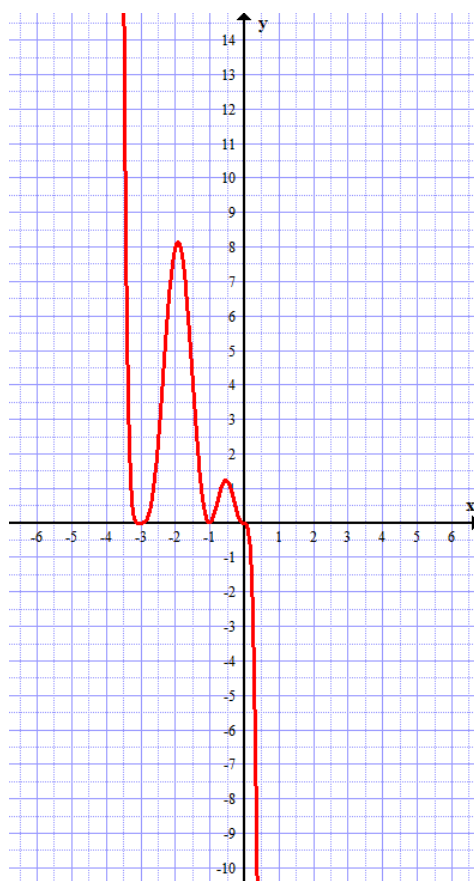
b) $N : x_{1,2} = -1, x_3 = \frac{2}{5}, p(0) = -2$



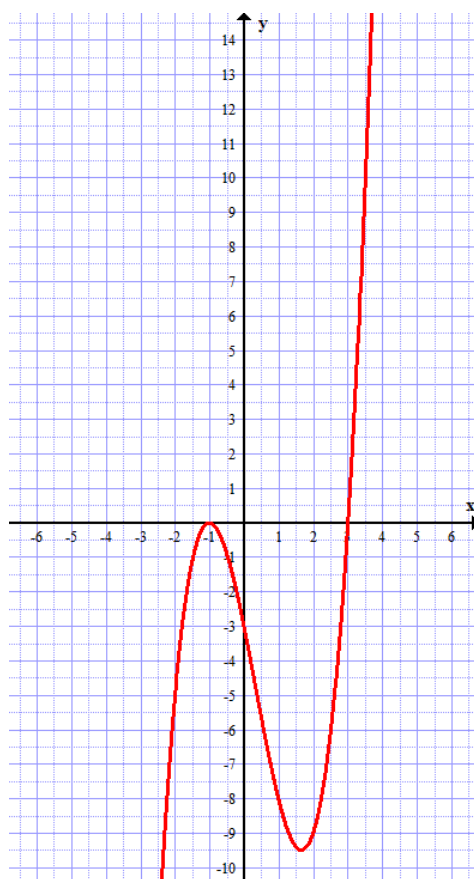
c) $N : x_{1,2} = 1, x_{3,4} = -2, p(0) = 4$



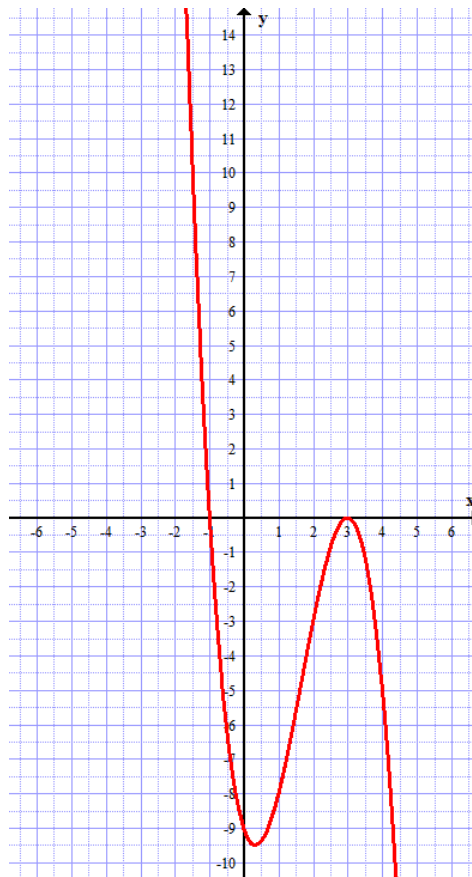
d) $N: x_{1,2,3} = 0, x_{4,5} = -1, x_{6,7,8,9} = -3, p(0) = 0$



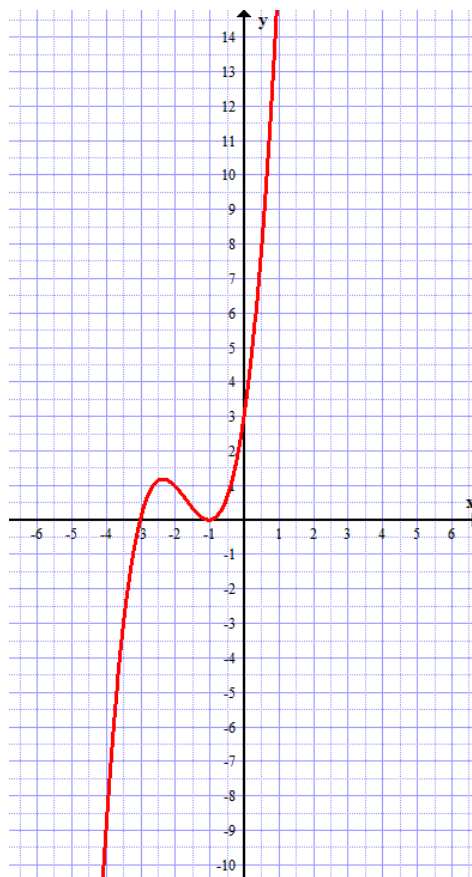
16) a) $N: x_{1,2} = -1, x_3 = 3, p(0) = -3$



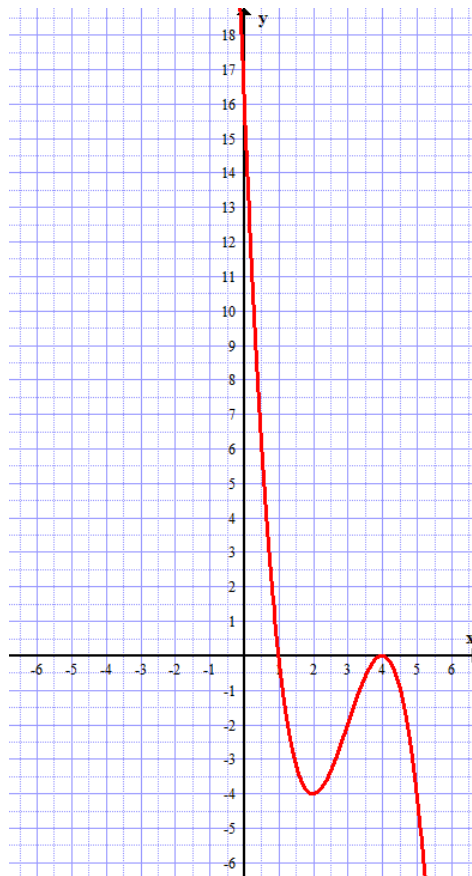
b) $N: x_1 = -1, x_{2,3} = 3, p(0) = -9$



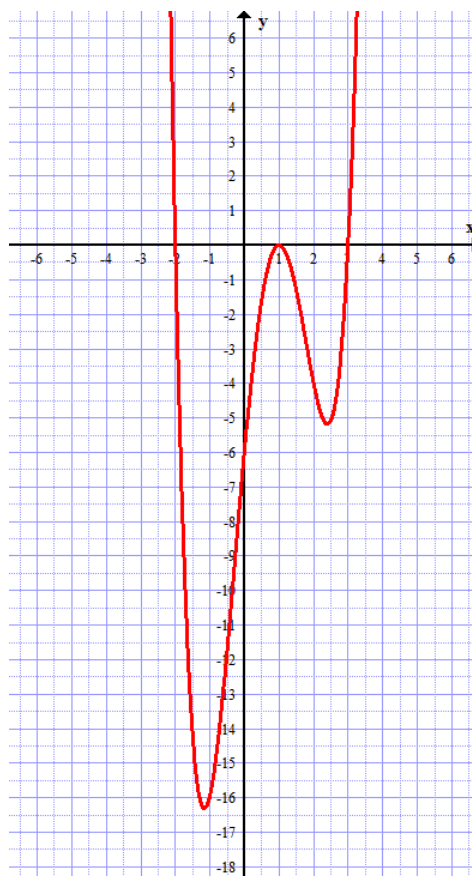
c) $N: x_{1,2} = -1, x_3 = -3, p(0) = 3$



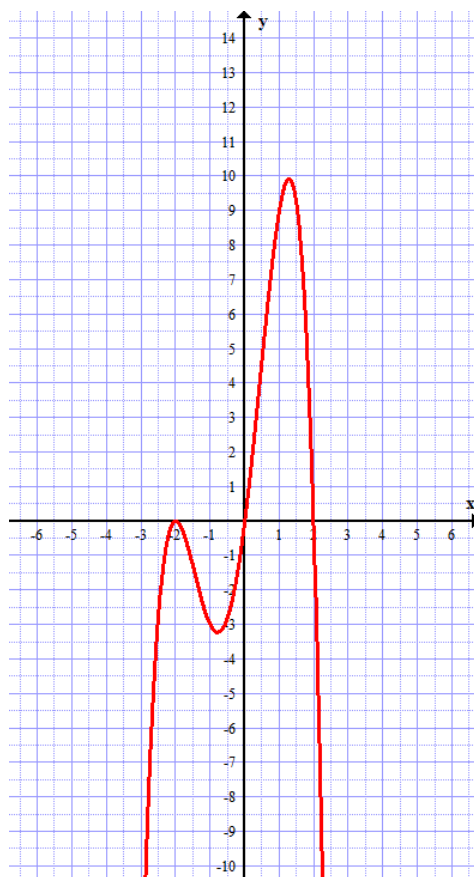
d) $N: x_1=1, x_{2,3}=4, p(0)=+16$



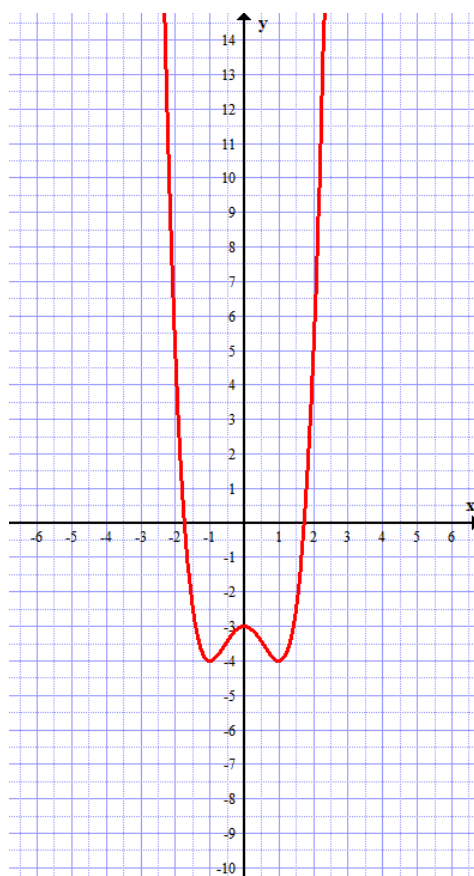
17) a) $N: x_1=-2, x_{2,3}=1, x_4=3, p(0)=-6$



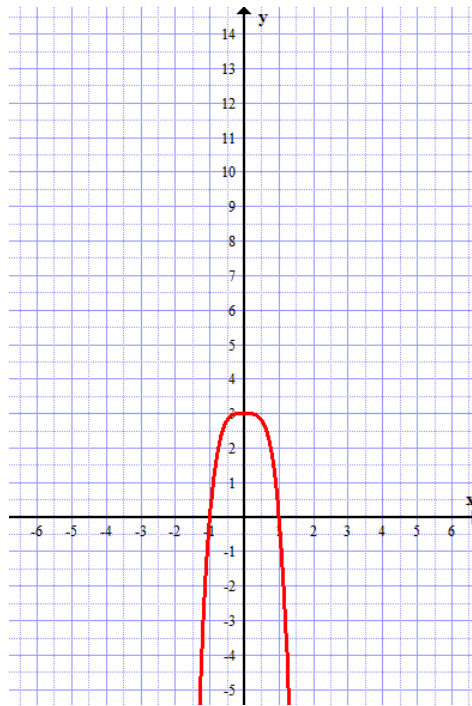
b) $N: x_{1,2} = -2, x_3 = 0, x_4 = 2, p(0) = 0$



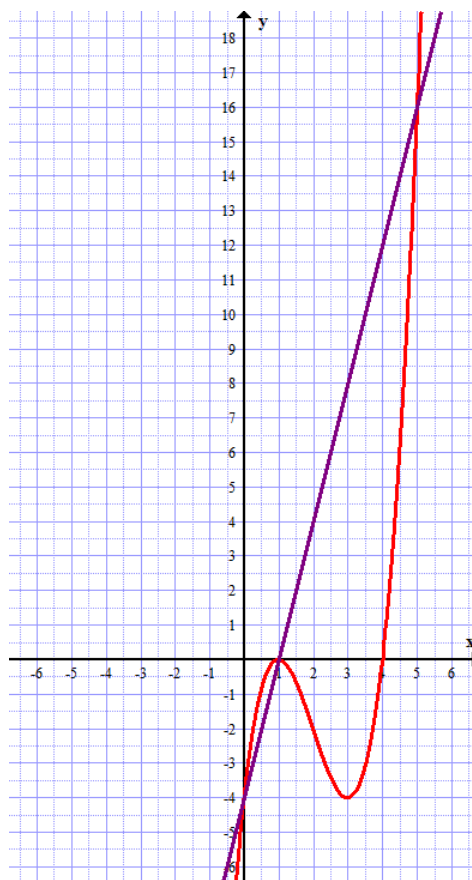
c) $N: x_1 = -\sqrt{3}, x_2 = \sqrt{3}, p(0) = -3$



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) $N: x_1 = -2, x_2 = \frac{1}{2}, x_3 = 2$

$f(0) = 4$

$A(-1, 9)$

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

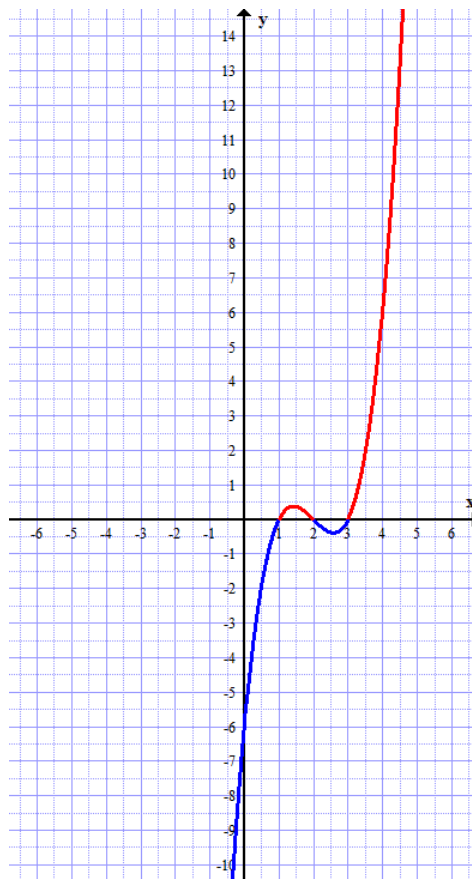
b) $N: x_{1,2} = -1, x_3 = \frac{3}{2}, x_4 = 2$

$f(0) = -6$

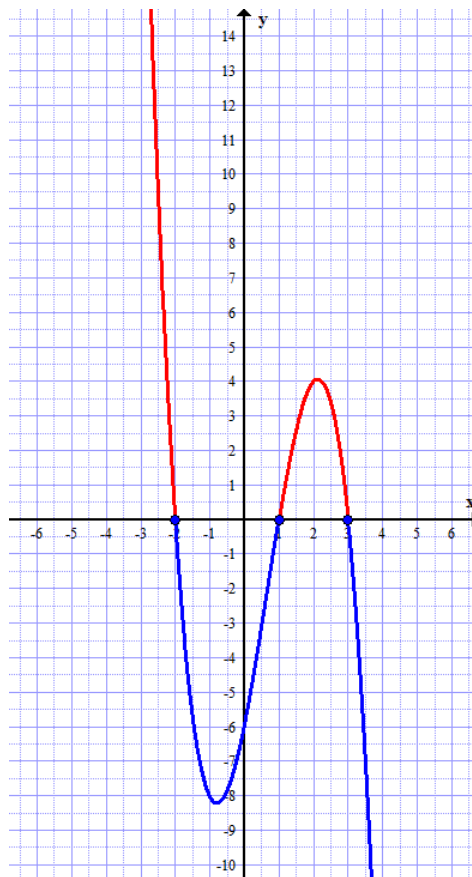
$B(1, -4)$

$p(x) = -2x^4 + 3x^3 + 6x^2 - 5x - 6$

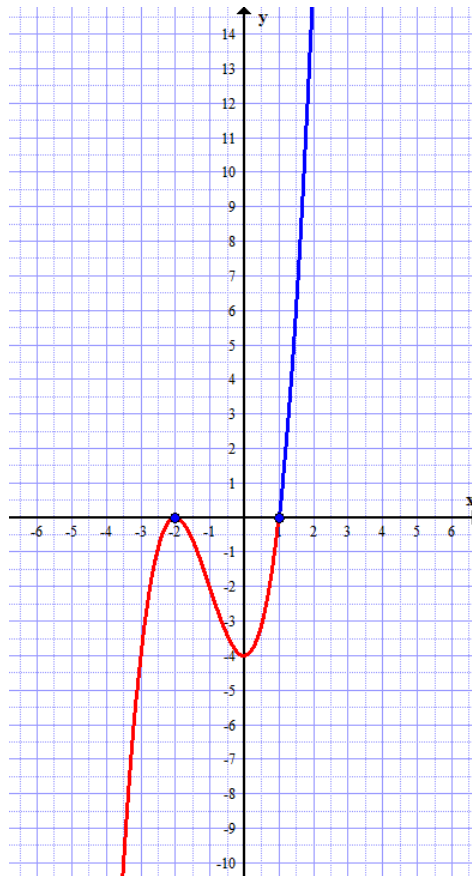
20) a) $x \in (-\infty, 1) \cup (2, 3)$



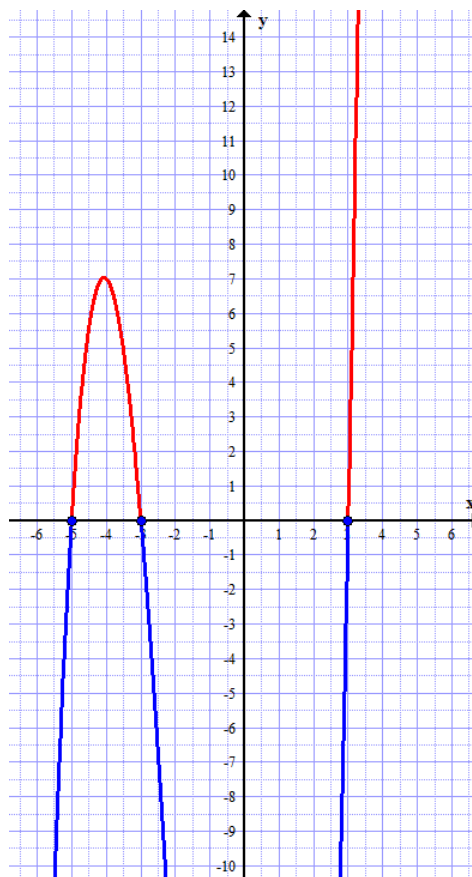
b) $x \in [-2, 1] \cup [3, +\infty)$



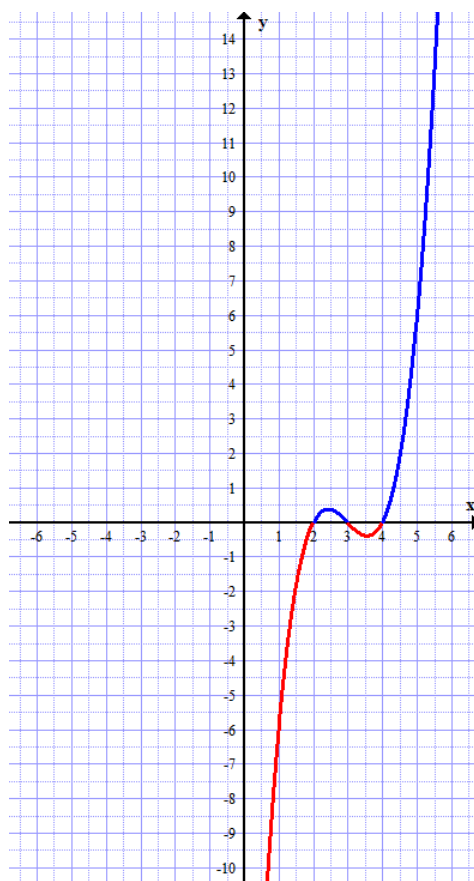
c) $x \in \{-2\} \cup [1, +\infty)$



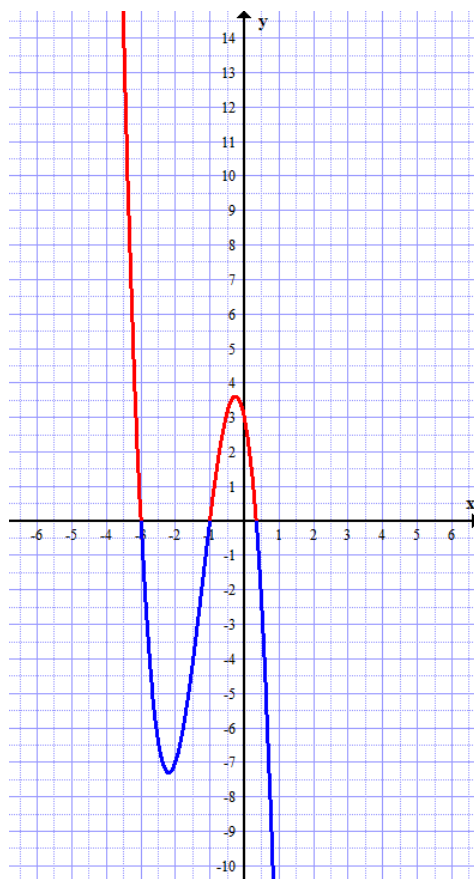
d) $x \in (-\infty, -5] \cup [-3, 3]$



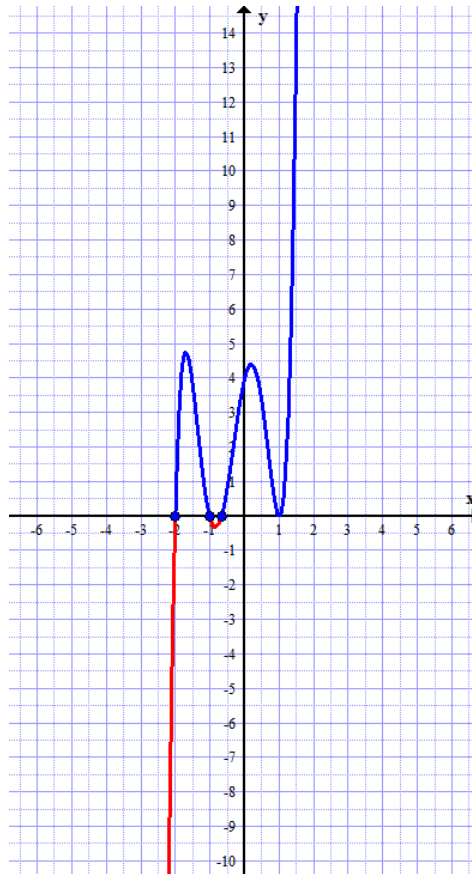
21) a) $x \in (2, 3) \cup (4, \infty)$



b) $x \in (-3, -1) \cup (\frac{1}{3}, +\infty)$



c) $x \in [-2, -1] \cup [-\frac{2}{3}, \infty)$



d) $x \in (-\infty, -1] \cup [0, 1]$

