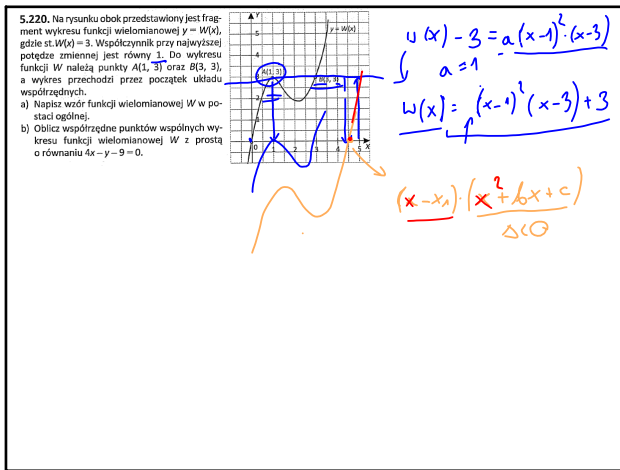
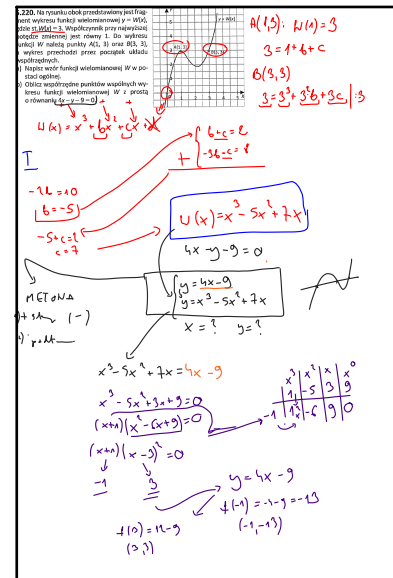
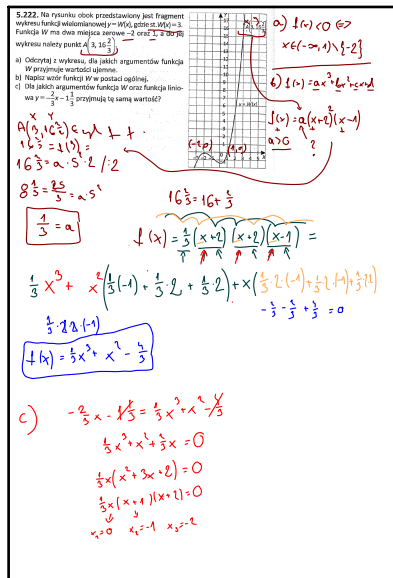




Twierdzenie o wielomianach stopnia trzeciego i wyżej.

Każdy wielomian stopnia wyższego niż drugi da się zapisać w postaci iloczynu wielomianów stopnia co najwyżej drugiego. (Wielomiany stopnia drugiego będą nierozkładalne - ich delty są mniejsze od 0).

$$W(x) = a(x-x_1)(x-x_2)(x-x_3) \dots (x-x_m)(x^2+bx+c_1)(x^2+bx+c_2) \dots$$

where $\Delta_1 < 0$ and $\Delta_2 < 0$.

54. $\left[\frac{a-1}{a^2-2a+1} + \frac{2(a-1)}{a^2-4} - \frac{4(a+1)}{a^2+a-2} + \frac{a}{a^2-3a+2} \right] \times \frac{36a^3-144a-36a^2+144}{a^3+27}$

55. $\left[\frac{3(x+2)}{2(x^3+x^2+x+1)} + \frac{2x^2-x-10}{2(x^3-x^2+x-1)} \right] : \left[\frac{5}{x^2+1} + \frac{3}{2(x+1)} - \frac{3}{2(x-1)} \right]$

56. $\left(\frac{x-y}{2y-x} - \frac{x^2+y^2+y-2}{x^2-xy-2y^2} \right) : \frac{4x^4+4x^2y+y^2-4}{x^2+y+xy+x}$

57. $\frac{x^2+a-2}{a^2+1-3a^3} \left[\frac{(a+2)^2-a^2}{4a^2-4} - \frac{3}{a^2-a} \right]$

58. $\frac{2a^2(b+c)^{2n}-\frac{1}{2}}{a^{2n}-a^3-2a^2-a} : \frac{2a(b+c)^n-1}{a^2c-a(nc-c)}$

59. $\frac{1}{a(a-b)(a-c)} + \frac{1}{b(b-a)(b-c)} + \frac{1}{c(c-a)(c-b)}$

60. $\frac{1+(a+x)^{-1}}{1-(a+x)^{-1}} \left[1 - \frac{1-(a^2+x^2)}{2ax} \right]; x = \frac{1}{a-1}$

61. $\left[\frac{2+ba^{-1}}{a+2b} - 6b(4b^2-a^2)^{-1} \right] : \left(2a^nb + 3a^{n+1} - \frac{6a^{n+2}}{2a-b} \right)^{-1}$

54. $\left[\frac{a-1}{a^2-2a+1} + \frac{2(a-1)}{a^2-4} - \frac{4(a+1)}{a^2+a-2} + \frac{a}{a^2-3a+2} \right] \times \frac{36a^3-144a-36a^2+144}{a^3+27}$

Handwritten solution shows the simplification of the expression, resulting in $\frac{36(a+6)}{a^3+27}$.

58. $\frac{2 \cdot (2a^2(b+c)^{2n} - \frac{1}{2})}{2(m^2 - a^2 - 2a^2 - a)} \cdot \frac{2a(b+c)^n - 1}{a^2c - a(nc - c)}$

$$\frac{4a^2(b+c)^{2n} - 1}{2a(m^2 - a^2 - 2a^2 - a)} \cdot \frac{c(a - m + 1)}{2a(b+c)^n - 1} =$$

$$\frac{(2a(b+c)^n - 1)(2a(b+c)^n + 1)}{2(m^2 - (a+1)^2)} \cdot \frac{c(a - m + 1)}{2a(b+c)^n - 1} =$$

$$\frac{L}{2(m - a - 1)(m + a + 1)} \cdot \frac{c(a - m + 1) - 1}{1} = \frac{-c(2a(b+c)^n + 1)}{2(m + a + 1)}$$