

① Решить уравнение:

$$\frac{2x-1}{3} - \frac{4-x}{2} = x+1 + \frac{x-3}{6} \quad / \cdot 6 \quad \left| \quad \frac{3(x+1)}{2} - \frac{2(x-3)}{5} + 2x = \frac{31x}{10} + 5 \quad / \cdot 10 \right.$$

$$4x-2-12+3x = 6x+6+x-3 \quad (I)$$

$$15x+15 - 4x+12 + 20x = 31x+50 \quad (II)$$

$$7x-14 = 7x+3$$

$$31x+27 = 31x+50$$

$$0 \cdot x = 17 \quad \text{нет решения}$$

$$0 \cdot x = 23 \quad \text{нет решения}$$

② Решить уравнение:

$$\frac{10x-18}{12x^2-27} - \frac{1}{2x+3} + \frac{4}{18x-27} - \frac{5}{9(2x-3)} = 0 \quad (I)$$

$$\frac{10x-18}{3(4x^2-9)} - \frac{1}{2x+3} + \frac{4}{9(2x-3)} - \frac{5}{9(2x-3)} = 0$$

$$\frac{10x-18}{3(2x-3)(2x+3)} - \frac{1}{2x+3} - \frac{1}{9(2x-3)} = 0 \quad / \cdot 9(2x-3)(2x+3)$$

$$2x \neq 3 \wedge 2x \neq -3$$

$$x \neq \pm \frac{3}{2}$$

$$30x-54-9(2x-3)-(2x+3) = 0$$

$$30x-54-18x+27-2x-3 = 0$$

$$10x = 30 \quad \text{т.е.} \quad \boxed{x=3}$$

$$\frac{1}{18x^2-30x} - \frac{1}{12x^2-20x} + \frac{3(x+1)}{18x^2-50} - \frac{1}{6x} = 0 \quad (II)$$

$$\frac{1}{6x(3x-5)} - \frac{1}{4x(3x-5)} + \frac{3(x+1)}{2(9x^2-25)} - \frac{1}{6x} = 0$$

$$\frac{2(3x+5)-3(3x+5)+18x(x+1)-2(9x^2-25)}{12x(3x-5)(3x+5)} = 0 \quad / \cdot 12x(3x-5)(3x+5)$$

$$x \neq 0, \quad x \neq \pm \frac{5}{3}$$

$$6x+10-9x-15+18x^2+18x-18x^2+50 = 0$$

$$15x = -45 \quad \text{т.е.} \quad \boxed{x=-3}$$

③ Упростить выражение:

$$(I) \frac{1-x}{4+x} \cdot \frac{x^2-16}{x^2-9} \cdot \frac{4-x}{3-x} = \frac{1-x}{4+x} \cdot \frac{(x-4)(x+4)}{(x-3)(x+3)} \cdot \frac{3-x}{4-x} = \frac{(1-x)(x-4)(x-3)}{(x-3)(x+3)(x+4)} = \frac{1-x}{x+3}$$

$$(II) \frac{m^2+4m}{m^2-16} \cdot \frac{m^3+4m^2}{m^5} \cdot \frac{m^2-1}{3m^4+3m^3} = \frac{m(m+4)}{(m-4)(m+4)} \cdot \frac{m^2(m+4)}{m^5} \cdot \frac{3m^2(m+1)}{(m-1)(m+1)} = \frac{3m}{m-1}$$

4) УПРОСТИТЬ ИЗРАЖ:

$$\begin{aligned}
 (1) & \left(\frac{2}{m^2-m} - \frac{2m}{1-m^2} \right) \cdot \frac{2m^2+2m}{m^3-1} + \frac{4}{m-1} = \\
 & = \left(\frac{2}{m(m-1)} + \frac{2m}{(m-1)(m+1)} \right) \cdot \frac{2m(m+1)}{(m-1)(m^2+m+1)} + \frac{4}{m-1} = \\
 & = \frac{2m+2+2m^2}{m(m-1)(m+1)} \cdot \frac{2m(m+1)}{(m-1)(m^2+m+1)} + \frac{4}{m-1} = \\
 & = \frac{2(m^2+m+1) \cdot 2m}{m(m-1)^2(m^2+m+1)} + \frac{4}{m-1} = \frac{4+4(m-1)}{(m-1)^2} = \frac{4+4m-4}{(m-1)^2} = \frac{4m}{(m-1)^2}
 \end{aligned}$$

$$\begin{aligned}
 (II) & \left(\frac{3}{x-1} - \frac{3x^2+3x+3}{x^2-1} ; \frac{x^4-x}{x^3+1} \right) \cdot \frac{x-x^2}{3} = \\
 & = \left(\frac{3}{x-1} - \frac{3(x^2+x+1)}{(x-1)(x+1)} ; \frac{(x+1)(x^2-x+1)}{x(x-1)(x^2+x+1)} \right) \cdot \frac{x(1-x)}{3} = \\
 & = 3 \cdot \frac{x^2-x-x^2+x-1}{x(x-1)^2} \cdot \frac{-x(x-1)}{3} = \frac{1}{x-1}
 \end{aligned}$$

5) ОПРЕДЕЛИТЬ ПАРАМЕТР ТАКО ДА ПОЛИНОМ БУДЕ ДЕЛИМЬ ВУМОМ.

(I) $f(x) = x^3 - 3nx^2 + 4(n^2+1)x - (n^3+5)$ ДЕЛИМЬ СЯ $x-1$

$$f(1) = 1 - 3n + 4(n^2+1) - n^3 - 5 = 0 \quad \text{Т.е.} \quad n^3 - 4n^2 + 3n = 0$$

$$n(n^2 - 4n + 3) = 0 \Rightarrow n = 0 \vee n^2 - 4n + 3 = 0 \Rightarrow n = 0 \vee n^2 - 3n - n + 3 = 0$$

$$\Rightarrow n = 0 \vee n(n-3) - (n-3) = 0 \Rightarrow n = 0 \vee (n-3)(n-1) = 0$$

$$\Rightarrow n = 0 \vee n = 3 \vee n = 1$$

(II) $f(x) = 9(x-m)^2(5x-16) - (x-12)(7x-19)^2$ ДЕЛИМЬ СЯ $x-3$

$$f(3) = 9(3-m)^2(-1) + 9 \cdot 4 = 0 \quad \text{Т.е.} \quad (3-m)^2 = 4$$

$$\Rightarrow 3-m = 2 \vee 3-m = -2 \Rightarrow m = 1 \vee m = 5$$