Шахмейстер. Дроби.

## 1. Сократите дроби:

a) 
$$\frac{16a - 4b}{12a - 3b}$$

$$6) \ \frac{4x^5y - 12x^3y}{2x^5y^2 - 6x^3y^2}$$

$$\mathbf{B)} \ \frac{6x^2 - 24xy + 24y^2}{4y^2 - x^2}$$

$$\Gamma) \frac{(2x^2 + 4x)^2}{(4x+8)^2}$$

## 2. Выполните действия:

a) 
$$\frac{b^2+1}{b^2(b-1)}-\frac{2}{b(b-1)}$$

$$6) \ \frac{4}{x^2 - 25} - \frac{2}{x+5} - \frac{x+2}{5-x}$$

B) 
$$\frac{5-3x}{64-x^2} - \frac{2-x}{x^2-16x+64}$$

r) 
$$\frac{x^2 - 5x + 4}{x - 1} + \frac{x^2 + 4x + 3}{x + 1}$$

### 3. Сократите дроби:

a) 
$$\frac{4x + 16y}{3x + 12y}$$

$$6) \ \frac{8a^3z - 4a^2z^2}{12a^2z^4 - 6az^5}$$

$$\mathbf{B)} \ \frac{1 - 9z^2}{18z^3 + 12z^2 + 2z}$$

$$\Gamma) \frac{(4y^2 - 8y)^2}{(8y - 16)^2}$$

#### 4. Выполните действия:

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

6) 
$$\frac{3}{b+2} + \frac{2b-5}{4-b^2} + \frac{5}{b-2}$$

B) 
$$\frac{x-2}{3x+6} + \frac{1}{x^2-4} + \frac{x-6}{6-3x}$$

r) 
$$\frac{y+2}{25-(y+1)^2} - \frac{4}{y+6} + 2$$

#### 5. Упростите выражения:

a) 
$$\left(\frac{2x}{1-3y} + \frac{2x}{3y+1}\right) : \frac{4x^2 + 14x}{9y^2 + 1 - 6y}$$

д) 
$$\frac{3a^4 - 3a^2b^2}{15(a^2 - b^2)}$$

e) 
$$\frac{x^4 - 2x^2 + 1}{1 - x^4}$$

ж) 
$$\frac{15a^3b + 15ab^3}{a^4 - b^4}$$

3) 
$$\frac{x^2 - y^2}{3x - 2x^2 + 3y - 2xy}$$

д) 
$$\frac{2}{y^2-4y+3}-\frac{1}{y^2-5y+4}$$

e) 
$$\frac{3-a}{6-5a+a^2} + \frac{a-4}{6a-a^2-8}$$

ж) 
$$\frac{4-x}{25-10x+x^2} - \frac{3}{x^2+10x+25} - \frac{x+4}{25-x^2}$$

3) 
$$\frac{a+1}{25-a^2} - \frac{4}{a+5} + 2$$

д) 
$$\frac{6x^4 - 6x^2y^2}{4y^4 - 4x^4}$$

e) 
$$\frac{y^4 - 1}{1 + 2y^2 + y^4}$$

$$\mathbb{K}) \ \frac{7x^2y^4 + 7x^4y^2}{x^6 + y^6}$$

$$3) \frac{x^4 + x^2y^2 + y^4}{x^2 - xy + y^2}$$

д) 
$$\frac{x^2+5x+4}{x+1}-\frac{x^2-4x+3}{x-1}$$

e) 
$$\frac{2}{x^2 - 3x + 2} - \frac{1}{x^2 - 6x + 5}$$

ж) 
$$\frac{3x+2}{x^2-2x+1} - \frac{6}{x^2-1} - \frac{3x-2}{x^2+2x+1}$$

3) 
$$\frac{x-5}{-12+7x-x^2} + \frac{x-3}{x^2-9x+20}$$

6) 
$$\left(\frac{1+n}{n^2-mn} - \frac{1-m}{m^2-mn}\right) : \frac{m+n}{m^2n-n^2m}$$

B) 
$$\frac{x^3 - 9xy^2}{9y^2 + x^2} \cdot \left(\frac{x + 3y}{x^2 - 3xy} + \frac{x - 3y}{3xy + x^2}\right)$$

$$\Gamma$$
)  $\frac{(3a-2b)^2}{b-3a} + \frac{9a^2}{3a-b}$ 

д) 
$$\frac{k^2 - p^2}{k^2 - p^2 + 12kn + 36n^2} + \frac{12n(3n+p)}{p^2 - k^2 - 12kn - 36n^2}$$

e) 
$$\frac{12bc^2 + b^3}{(b-2c)^2} - \frac{6b^2c + 5c^3}{(2c-b)^2} + \frac{3c^3}{4bc - 4c^2 - b^2}$$

ж) 
$$(1-b)^2 \left(\frac{1}{(1-b)^2} - \frac{1}{1-b^2}\right) + \frac{3+b}{1+b}$$

3) 
$$\left(\frac{5x}{x-9} + \frac{42x}{x^2 - 18x + 81}\right) : \frac{5x-3}{x^2 - 81} - \frac{9(x+9)}{x-9}$$

и) 
$$\frac{(5x-1)^3}{5x-2} + \frac{-1+5x}{2-5x}$$

K) 
$$\frac{(2y+3x)^2}{2y-3z} - \frac{(2y-3z)^2}{2y+3z}$$

#### 6. Упростите выражения:

a) 
$$\frac{y^3 - 9x^2y + x}{xy^2 - 9x^3} + (1 - 3x - y) \cdot \left(\frac{3x + y + 1}{9x^2 - y^2} - \frac{3x + y}{9x^2 - 3x + y - y^2}\right)$$

6) 
$$\left(\frac{ab+b^2}{5a^2-5ab}+ab+b^2\right)\cdot \frac{5a}{a+b}-\frac{b}{a-b}$$

B) 
$$\frac{x^4 - 2x^3 + 3x^2}{x^4 - x^2 + 4x - 4} - \frac{x^2}{x^2 + x - 2} + \frac{x^2}{x^2 - x + 2} - 1$$

r) 
$$\left(\frac{x^2+4}{4x^2+2x} - \frac{2x}{2x^3+x^2+8x+4}\right) \cdot \frac{4x^2+2x}{x^6-64} - \frac{x^2-3}{x^4-16}$$

д) 
$$\frac{\frac{a-b}{1+ab} - \frac{a-c}{1+ac}}{1 + \frac{(a-b)(a-c)}{(1+ab)(1+ac)}}$$

e) 
$$\left(\frac{x+3}{x+2}\right)^3 - \frac{x-4}{x+1}$$

$$\times$$
  $\left(\frac{4n+1}{2n^2+n-10}-\frac{4}{n^2-4}\right)\cdot\frac{4n^2+10n}{4n+9}+\frac{4}{n+2}1$ 

3) 
$$\left(\frac{36}{\frac{7a-17b}{11a-19b} - \frac{11a-19b}{7a-17b}} + \frac{77a-166b}{2a-b}\right) : \frac{45b^2}{2a^2 - 5ab + 2b^2}$$

и) 
$$\left(\frac{2}{a^2-6a}+\frac{1}{2(a+8)}+\frac{5}{(a-6)(a+4)}\right):\frac{4a+a^2}{2a-12}$$

$$\mathsf{K}) \ \left(\frac{1}{x+2} + \frac{9}{2x^2 - x - 10} + \frac{8}{2x^2 - 5x}\right) \cdot \left(\frac{52}{x+4} + 2x - 13\right)$$

a) 
$$\left(x + \frac{3 - x^2}{x + 1}\right) : \frac{x + 3}{1 - x^2}$$

$$6) \ \frac{1}{a-2} - \frac{4a}{a^2 - 4} \cdot \left( \frac{1}{a-1} - \frac{1}{a^2 - a} \right)$$

B) 
$$\left(a+1+\frac{1}{a-1}\right):\frac{a^2}{a^2-2a+1}$$

r) 
$$\frac{-5x-6}{x^2-4} + \frac{x}{x^2-4} : \frac{x}{x-2} + \frac{x+2}{x-2}$$

д) 
$$\left(\frac{10}{25-b^2} + \frac{-1}{5+b} + \frac{1}{5-b}\right) (25-10b+b^2)$$

e) 
$$\left(\frac{5m}{m+3} - \frac{14m}{m^2 + 6m + 9}\right) : \frac{5m+1}{m^2 - 9} + \frac{3(m-3)}{m+3}$$

$$\mathbb{K}$$
)  $\left(\frac{4a}{a^2-1} + \frac{a-1}{a+1}\right) \cdot \frac{a}{a+1} - \frac{a}{a-1}$ 

3) 
$$\left(\frac{1}{2-4b} + \frac{b+1}{8b^3-1} \cdot \frac{4b^2+2b+1}{1+2b}\right) : \frac{1}{4b-2}$$

и) 
$$\left(\frac{2}{(a-2)^2} - \frac{a}{4-a^2}\right) : \frac{4+a^2}{4-a^2} + \frac{2}{a-2}$$

$$\text{K) } \frac{x+12}{x^3-9x}: \left(\frac{x-3}{2x^2+5x-3}-\frac{9}{9-x^2}\right)+\frac{1}{x^2}$$

a) 
$$\left(x + \frac{3 - x^3}{1 + x^2}\right) \cdot \frac{1 + x^2}{x^2 + 6x + 9}$$

6) 
$$\left(\frac{x+6}{3x+9} - \frac{1}{x+3}\right) \cdot \frac{3}{x-3} - \frac{6}{x^2-9}$$

B) 
$$\left(a-5+\frac{15}{a+5}\right):\frac{a^2-10}{a^2+10a+25}$$

r) 
$$\frac{3y-2}{y^2-4} + \frac{3}{y^2-4} \cdot \frac{y+2}{3} + \frac{y}{y+2}$$

д) 
$$\left(\frac{-1}{x-4} + \frac{16}{x^2-16} + \frac{2}{x+4}\right)(x^2-8x+16)$$

e) 
$$\left(\frac{5a}{a+1} - \frac{3a}{a^2+2a+1}\right) : \frac{5a+2}{a^2-1} + \frac{a-1}{a+1}$$

$$\mathbb{R}$$
)  $\left(\frac{36x}{x^2-81}+\frac{x-9}{x+9}\right)\cdot\frac{x}{x+9}-\frac{x}{x-9}$ 

3) 
$$\left(\frac{x^3-8}{x-2}+2x\right): (4-x^2)+\frac{x-1}{x-2}$$

и) 
$$\left(\frac{2}{4-x^2}-\frac{2}{(x-2)^2}\right):\frac{4}{(2-x)^2}-\frac{2-x}{x+2}$$

K) 
$$\left(\frac{2x}{x+3} + \frac{1}{x-1} - \frac{4}{x^2 + 2x - 3}\right) \cdot \frac{x}{2x+1} - \frac{3(x+4)}{x+3}$$

a) 
$$\left(a + \frac{6 - a^2}{1 + a}\right) : \frac{6 + a}{a^2 - 1}$$

6) 
$$\frac{3a}{a^2-9} - \frac{3}{a^2-9} \left( \frac{a+2}{3a-3} - \frac{1}{a-1} \right)$$

B) 
$$\left(a+6\frac{6}{a-6}\right)\cdot\frac{a^2-12a+36}{a^2-30}$$

r) 
$$\frac{3a-4}{a+1} + \frac{a}{a+1} : \frac{a}{a^2-1} + \frac{5-2a}{a+1}$$

д) 
$$\left(\frac{2}{a-5} - \frac{20}{a^2-25} + \frac{-1}{a+5}\right) (a^2 + 10a + 25)$$

e) 
$$\left(\frac{5x}{x-9} + \frac{42x}{x^2 - 18x + 81}\right) \cdot \frac{x^2 - 81}{5x - 3} - \frac{9(x+9)}{x-9}$$

ж) 
$$\left(\frac{32a}{64-a^2}+\frac{8-a}{8+a}\right):\frac{8+a}{8}-\frac{8}{8-a}$$

3) 
$$\left(\frac{a^3+1}{a+1}-a\right): (1-a^2)+\frac{2a}{a+1}$$

и) 
$$\frac{3-2m}{m+5} + \frac{(5-m)^2}{m} \cdot \left(\frac{m}{(m-5)^2} - \frac{m}{25-m^2}\right)$$

$$\mathsf{K}) \ \left( \frac{3}{x-3} + \frac{4}{x^2 - 5x + 6} + \frac{2x}{x-2} \right) : \frac{2x+1}{3} + \frac{3(x-2)}{3-x}$$

a) 
$$\left(b + \frac{3 - b^2}{b - 2}\right) : \frac{3 - 2b}{b^2 - 4b + 4}$$

6) 
$$\left(\frac{1}{b-1} - \frac{1}{b^2 - b}\right) \cdot \frac{b}{b+2} + \frac{4}{b^2 - 4}$$

B) 
$$\left(x+5+\frac{50}{x-5}\right):\frac{x^2+25}{x^2-10x+25}$$

r) 
$$\frac{5a-6}{a+2} + \frac{a}{a+2} \cdot \frac{a^2-4}{a} + \frac{10-3a}{a+2}$$

д) 
$$\left(\frac{4b}{b+8} - \frac{9b}{b^2+16b+64}\right) \cdot \frac{b^2-64}{4b+23} + \frac{8(b-8)}{b+8}$$

e) 
$$\left(\frac{2}{3-b} - \frac{4b}{9-b^2} + \frac{-1}{3+b}\right) (9+6b+b^2)$$

ж) 
$$\left(\frac{28b}{b^2-49}+\frac{b-7}{b+7}\right)\cdot\frac{b}{b+7}-\frac{b}{b-7}$$

3) 
$$\frac{a^2}{3+a} \cdot \frac{9-a^2}{a^2-3a} + \frac{27+a^3}{3-a} : \left(3 + \frac{a^2}{3-a}\right)$$

и) 
$$\left(\frac{9}{y^2-9}+\frac{3}{(3-y)^2}\right):\frac{6}{(y-3)^2}+\frac{1-2y}{3+y}$$

$$\mathsf{K}) \ \left( \frac{2}{x+1} + \frac{10}{x^2 - 3x - 4} + \frac{3x}{x-4} \right) : \frac{3x+2}{3} + \frac{x-1}{4-x}$$

a) 
$$\left(2x - y - \frac{2x - y^2}{y}\right) \cdot \frac{a}{3xy - 3x} - \frac{a - 1}{y}$$

6) 
$$\frac{m}{m^2 - 2m + 1} - \frac{1}{1 - m} \cdot \frac{m}{m + 1} - \frac{2}{m + 1}$$

B) 
$$\left(\frac{1}{1-a} - \frac{1}{1+a} - 1\right) \cdot (a^2 - 1)$$

r) 
$$\left(\frac{a}{b(b+a)} - \frac{a-b}{a^2+ab}\right) : \left(\frac{b^2}{a^3-ab^2} + \frac{1}{a+b}\right)$$

д) 
$$\left(\frac{4y^2+21}{2y+2}-6\right):\frac{2xy+4y-3x-6}{2-2y^2}$$

e) 
$$\left(\frac{x^2 - 2x + 4}{4x^2 - 1} \cdot \frac{2x^2 + x}{x^3 + 8} - \frac{x + 2}{2x^2 - x}\right) : \frac{4}{x^2 + 2x} - \frac{x + 4}{3 - 6x}$$

ж) 
$$\left(\frac{x^2+3x+2}{x^2+2x+1}-\frac{3x+4}{3x+3}\right)\cdot\frac{x^2-1}{3}$$

3) 
$$\left(\frac{a}{a+b} + \frac{b}{a-b} + \frac{2ab}{b^2 - a^2}\right) \cdot \frac{a}{a+b} - \left(\frac{b}{b-a} - \frac{2ab}{a^2 - b^2}\right) \cdot \frac{a-b}{a+b}$$

и) 
$$ab + \frac{ab}{a+b} \cdot \left(\frac{a+b}{a-b} - a - b\right)$$

$$\text{K) } \frac{x^2 - 3x + 2}{x - 1} - \frac{3x^2 + 7x - 10}{3x + 10} - \frac{5 - 4x - 9x^2}{x + 1}$$

a) 
$$\left(3a - 1 - \frac{3a - 1}{x}\right) \cdot \frac{x}{2x - 2} - 2a$$

6) 
$$\left(\frac{1+x}{1-2x+x^2} - \frac{1}{x+1}\right) : \frac{x}{x-1} + \frac{2}{x+1}$$

B) 
$$\left(1 - \frac{1}{x-1} + \frac{1}{x+1}\right) : \frac{1}{x^2-1}$$

r) 
$$\left(\frac{y}{2x^2 + xy} - \frac{x}{2xy + y^2}\right) \cdot \left(\frac{x}{x^2 - y^2} - \frac{x + y}{x^2 - xy}\right)$$

д) 
$$\left(4-\frac{9x^2-8}{3x-3}\right):\frac{2a+6x-3ax-9x2}{2x^2-2}$$

e) 
$$\left(\frac{c+5}{5c-1} + \frac{c+5}{c+1}\right) : \frac{c^2+5c}{1-5c} + \frac{c^2+5}{c+1}$$

ж) 
$$\left(\frac{3x^2+8x-7}{3x^2-3}-\frac{x+3}{x+1}\right):\frac{2}{x^2-2x+1}$$

3) 
$$\left(\frac{2}{2+m} - \frac{m}{m-2} - \frac{4}{4-m^2}\right) : \left(\frac{2}{2+m} + \frac{4}{m^2-4} + \frac{m}{2-m}\right)$$

$$\text{H}) \ \frac{3}{x+y} - \frac{3x-3y}{2x-3y} \cdot \left(\frac{2x-3y}{x^2-y^2} - 2x + 3y\right)$$

к) 
$$\frac{x^2+7x-8}{x-1} - \frac{7x^2+3x-10}{7x+10} - \frac{4-5x-9x^2}{x+1}$$

a) 
$$\frac{2}{mn}: \left(\frac{1}{m} - \frac{1}{n}\right)^2 - \frac{m^2 + n^2}{(m-n)^2}$$

6) 
$$\left(\frac{5x^2 - 15xy}{x^2 - 9y^2} - \frac{3xy + 9y^2}{x^2 + 6xy + 9y^2}\right) : \left(\frac{5}{y} - \frac{3}{x}\right)$$

B) 
$$\left(\frac{1}{(2a-b)^2} + \frac{2}{4a^2 - b^2} + \frac{1}{(2a+b)^2}\right) \cdot \frac{4a^2 + 4ab + b^2}{16a}$$

r) 
$$\left(x - \frac{4xy}{x+y} + y\right) \cdot \left(x + \frac{4xy}{x-y} - y\right)$$

д) 
$$\left(\frac{0,5b-1,5}{0,5b^2-1,5b+4,5}-\frac{2b-6}{\frac{1}{3}b^3+9}\right):\frac{b-3}{0,8b^3+21,6}$$

e) 
$$\frac{x - \frac{yz}{y - z}}{y - \frac{xz}{x - z}}$$

ж) 
$$\frac{\frac{3}{2}a^2 - 2ab + \frac{2}{3}b^2}{\frac{1}{4}a^2 - \frac{1}{9}b^2} + \frac{6b}{\frac{3}{4}a + \frac{1}{2}b}$$

3) 
$$\frac{12c-4c^2}{2c+3} + \frac{1}{2c-3} : \left(\frac{4}{4c^2-9} - \frac{6c-9}{8c^3+27}\right)$$

и) 
$$\left(\frac{3x^2+5x-14}{3x^2-12}-\frac{x+3}{x+2}\right):\frac{2}{x^2-4x+4}$$

$$\kappa) \frac{2x^2 + x - 1}{x + 1} + \frac{(3x - x^2 - 2)^2}{x^2 - 4x + 4}$$

a) 
$$\left(\frac{4a^2 - 6ac}{4a^2 - 12ac + 9c^2} - \frac{6ac + 9c^2}{4a^2 + 12ac + 9c^2}\right) \cdot \frac{6a + 9c}{4a^2 + 9c^2}$$

$$6) \ \frac{4c^2}{(c-2)^4} : \left(\frac{1}{(c+2)^2} + \frac{1}{(c-2)^2} + \frac{2}{c^2 - 4}\right)$$

B) 
$$\left(a - \frac{1 - 2a^2}{1 - a} + 1\right) : \left(1 - \frac{1}{1 - a}\right)$$

r) 
$$\left(\frac{a}{0,5a+1} + \frac{\frac{2}{3}a}{2-a} + \frac{2a}{\frac{1}{4}a^2 - 1}\right) \cdot \frac{0,5a-1}{0,5a-2}$$

д) 
$$\left(\frac{a-x}{a} + \frac{x}{a-x}\right) \left(\frac{a+x}{a} - \frac{x}{a+x}\right)$$

e) 
$$\left(\frac{2x^2+3x-5}{x^2-2x+1}-\frac{4x+5}{2x-2}\right)\cdot\frac{x^2-1}{5}$$

$$\mathbb{K}$$
)  $\left(\frac{4}{a^2-4a}-\frac{3a+32}{a^3-64}\right):\frac{a-8}{a^3+4a^2+16a}-\frac{4}{4-a}\right)$ 

3) 
$$\frac{y}{x+y} + \left(\frac{2x+1}{x+y} - \frac{2xy+y}{y^2 - x^2}\right) : \frac{2x+1}{x-y}$$

$$\text{ {\rm H}) } \ \frac{x^2}{(x-y)(x-z)} + \frac{y^2}{(y-x)(y-z)} + \frac{z^2}{(z-x)(z-y)}$$

$$\text{K)} \ \frac{2x^2 - 3x + 1}{x - 1} + \frac{(4x - x^2 - 3)^2}{x^2 - 6x + 9}$$

a) 
$$\left(m^2 + \frac{6 - m^4}{m^2 - 1}\right) \cdot \frac{1 + m}{6 - m^2}$$

6) 
$$\frac{2m}{m^2-4} - \frac{2}{m^2-4} : \left(\frac{m+1}{2m-2} - \frac{1}{m-1}\right)$$

B) 
$$\left(m-4+\frac{32}{m+4}\right)\cdot\frac{m^2+8m+16}{m^2+16}$$

r) 
$$\frac{3-x^2}{x^2-1} + \frac{3x}{x^2-1} : \frac{x}{x-1} + \frac{x-1}{x+1}$$

д) 
$$\left(\frac{-1}{a-2} + \frac{8}{a^2-4} + \frac{2}{a+2}\right) (a^2-4a+4)$$

e) 
$$\left(\frac{2x}{x-7} + \frac{7x}{x^2 - 14x + 49}\right) : \frac{2x-7}{x^2 - 49} - \frac{7(x+7)}{x-7}$$

$$\mathbb{R}$$
)  $\left(\frac{20x}{25-x^2}+\frac{5-x}{5+x}\right):\frac{5+x}{5}-\frac{5}{5-x}$ 

3) 
$$\frac{8-n^3}{2+n}$$
:  $\left(2+\frac{n^2}{n+2}\right)\frac{n^2}{n-2}\cdot\frac{4-n^2}{n^2+2n}$ 

и) 
$$\left(\frac{2}{(1-x)^2} + \frac{1}{x^2-1}\right) \cdot (x-1)^2 - \frac{3x}{x+1}$$

$$\mathsf{K}) \ \left( \frac{1}{x+2} + \frac{5}{x^2 - x - 6} + \frac{2x}{x-3} \right) \cdot \frac{x}{2x+1} - \frac{x-9}{2(3-x)}$$

a) 
$$\left(a + \frac{2+a^2}{1-a}\right) \cdot \frac{1-2a+a^2}{a+2}$$

$$\text{ 6) } \frac{b^2}{b^2 - 1} + \frac{1}{b^2 - 1} : \left(\frac{1}{2b - b^2} - \frac{1}{2 - b}\right)$$

B) 
$$\left(b+3+\frac{18}{b-3}\right)\cdot\frac{b^2-6b+9}{b^2+9}$$

r) 
$$\frac{7-5m}{m-4} + \frac{4m}{m+4} \cdot \frac{m^2-16}{4m} + \frac{9m-23}{m-4}$$

д) 
$$\left(\frac{1}{3+a} - \frac{6}{9-a^2} + \frac{2}{3-a}\right) \cdot (9 - 6a + a^2)$$

e) 
$$\left(\frac{3a}{a+6} - \frac{2a}{a^2+12a+36}\right) : \frac{3a+16}{a^2-36} + \frac{6(a-6)}{a+6}$$

ж) 
$$\left(\frac{16b}{16-b^2} + \frac{4-b}{4+b}\right) : \frac{4+b}{4} - \frac{4}{4-b}$$

3) 
$$\left(\frac{a-1}{a+1} + \frac{a^3+1}{a^2-2a+1} \cdot \frac{a-1}{a^2-a+1}\right) : \frac{a^2+1}{a+1}$$

и) 
$$\left(\frac{4}{4-x^2} - \frac{4}{(x-2)^2}\right) : \frac{2}{(2-x)^2} + \frac{4x+1}{x+2}$$

$$\mathsf{K}) \ \frac{a+4}{5(a-1)} : \left( \frac{9(a-1)}{3a+4} - \frac{(2a-7)^2}{3a^2+a-4} + \frac{2}{5(2-a)} \right)$$

a) 
$$\left(x + \frac{5 - x^2}{1 + x}\right) : \frac{x + 5}{x^2 + 2x + 1}$$

6) 
$$\left(\frac{x+10}{5x+25} - \frac{1}{x+5}\right) \cdot \frac{5}{x-5} - \frac{10}{x^2-25}$$

B) 
$$\left(a-1+\frac{2}{a+1}\right):\frac{a^2+1}{a^2+2a+1}$$

r) 
$$\frac{-a-24}{a-5} + \frac{a}{a+5} : \frac{a}{a^2-25} + \frac{6a-1}{a-5}$$

д) 
$$\left(\frac{2}{a-2} - \frac{8}{a^2-4} + \frac{-1}{a+2}\right) \cdot (a^2+4a+4)$$

e) 
$$\left(\frac{2m}{m-5} + \frac{m}{m^2 - 10m + 25}\right) \cdot \frac{m^2 - 25}{2m-9} - \frac{5(m+5)}{m-5}$$

$$\mathbb{K}$$
)  $\left(\frac{8a}{a^2-4} + \frac{a-2}{a+2}\right) \cdot \frac{a}{a+2} - \frac{a}{a-2}$ 

3) 
$$\left(\frac{m+2}{m+1} - \frac{8m^2 - 8}{m^3 - 1} : \frac{4m+4}{m^2 + m + 1}\right) \cdot \frac{1}{m}$$

и) 
$$\frac{(1-b)^2}{2b} \cdot \left(\frac{1}{(b-1)^2} - \frac{1}{1-b^2}\right) - \frac{2}{1+b}$$

$$\mathsf{K}) \ \left(\frac{4}{5a^2+a-4} - \frac{a+1}{9(5a-4)}\right) \cdot \frac{15a-12}{a+7} - \frac{2}{a+1}$$

a) 
$$\left(x + \frac{3 - x^2}{x + 1}\right) : \frac{x + 3}{1 - x^2}$$

6) 
$$\left(\frac{x+4}{3x+3} - \frac{1}{x+1}\right) : \frac{x+1}{3} + \frac{2}{x^2-1}$$

B) 
$$\left(a-2+\frac{8}{a+2}\right)\cdot\frac{a^2+4a+4}{a^2+4}$$

r) 
$$\frac{5m-21}{m^2-9} + \frac{m}{m^2-9} \cdot \frac{m+3}{m} + \frac{m-3}{m+3}$$

д) 
$$\left(\frac{4}{a+1} + \frac{2a}{a^2-1} + \frac{-1}{a-1}\right) \cdot (a^2 + 2a + 1)$$

e) 
$$\left(\frac{3a}{a-4} + \frac{10a}{a^2 - 8a + 16}\right) \cdot \frac{a^2 - 16}{3a-2} + \frac{4(a+4)}{4-a}$$

ж) 
$$\left(\frac{12b}{9-b^2} + \frac{3-b}{3+b}\right) : \frac{3+b}{3} - \frac{3}{3-b}$$

3) 
$$\left(\frac{1}{2-6a} + \frac{1}{27a^3 - 1} : \frac{1+3a}{1+3a+9a^2}\right) \cdot \frac{2+6a}{a}$$

$$\text{ H) } \frac{2}{x-1} + \frac{1-x^2}{1+x^2} \cdot \left(\frac{1}{(x-1)^2} - \frac{x}{1-x^2}\right)$$

$$\text{K)} \ \left(\frac{3a-1}{a^2-4}-\frac{9a}{3a^2+5a-2}\right) \cdot \frac{15a^3-60a}{12a+1}+\frac{5}{1-3a}$$

a) 
$$\frac{(2a-b)^2}{a-b} + \frac{b^2}{b-a}$$

6) 
$$\frac{x^3+y^3}{(x-y)^2} + \frac{3xy^2+y^3}{2xy-x^2-y^2}$$

$$B) \frac{a^3}{a-3} - \frac{3a^3 + 81}{a^2 - 9}$$

r) 
$$\frac{a-1}{2a+2} + \frac{a+1}{3-3a} + \frac{5a^3-1}{3a^2-3}$$

д) 
$$\frac{a^2-bc}{a^2-ab+bc-ac} + \frac{3b-a}{2b-2a} + \frac{a+2c}{3a-3c}$$

e) 
$$\frac{x-2}{(2x+4)^2}$$
:  $\left(\frac{x}{2x-4} - \frac{x^2+4}{2x^2-8} - \frac{2}{x^2+2x}\right)$ 

ж) 
$$1: \left(\frac{a}{a-b} + \frac{4a^2b - ab^2}{b^3 - a^3} + \frac{b^2}{a^2 + ab + b^2}\right) - \frac{-3ab}{(a-b)^2}$$

3) 
$$\left(\frac{2a-3b}{a-7b}-2+\frac{a-7b}{2a-3b}\right)\cdot\left(\frac{23a-29b}{a^2+8ab+16b^2}-\frac{15a-21b}{a^2+4ab}\right)$$

и) 
$$\frac{ab+cd}{(a+c)(b-c)} + \frac{ac+bd}{(a+b)(c-b)} + \frac{ad+bc}{(a+b)(a+c)}$$

$$\mathsf{K}) \ \frac{2}{3-a} + \frac{a+3}{a-2} : \left( \frac{9(a-2)}{3a+1} - \frac{(2a-9)^2}{3a^2 - 5a - 2} \right)$$

a) 
$$\frac{(3a-2b)^2}{b-3a} + \frac{9a^2}{3a-b}$$

$$6) \ \frac{12bc^2 + b^3}{(b-2c)^2} + \frac{3c^3}{4bc - 4c^2 - b^2}$$

B) 
$$\frac{4+10x+25x^2}{2+5x} - \frac{4-10x+25x^2}{2-5x}$$

$$\Gamma) \frac{(2y+3x)^2}{2y-3z} - \frac{(2y-3z)^2}{2y+3z}$$

д) 
$$\frac{1}{c^2-cd}-\frac{1}{d^2-cd}-\frac{4}{c^2-d^2}$$

e) 
$$\frac{1}{y-5z} - \frac{z}{x^2+2xy} - \frac{x+y+5z}{xy-10yz-5xz+2y^2}$$

ж) 
$$\left(\frac{b^2+9}{27-3b^2}+\frac{b}{3b+9}-\frac{3}{b^2-3b}\right):\frac{(3b+9)^2}{3b^2-b^3}$$

3) 
$$\left(\frac{2x+5y}{x^2-2xy} - \frac{9y}{x^2-4xy+4y^2}\right) \cdot \left(\frac{x-5y}{x+y} + 2 + \frac{x+y}{x-5y}\right)$$

$$\text{ \tiny M} ) \left( \left( \frac{x^2}{(x+1)^2} - \frac{y^2}{(y+1)^2} \right) : \left( \frac{x}{(x+1)^2} - \frac{y}{(y+1)^2} \right) + 1 \right) \cdot \frac{1 - xy}{(x+y)(y+1)}$$

$$\mathsf{K}) \ \left( \frac{1}{x+1} + \frac{5}{x^2 - 3x - 4} + \frac{2x - 2}{x - 4} \right) \cdot \frac{x - 1}{2x - 1} - \frac{x - 10}{2(4 - x)}$$

a) 
$$\frac{(3a-b)^3}{a-b} - \frac{b^3 - 9ab^2}{b-a}$$

6) 
$$\frac{a^2 + 5a}{a^2 - 18a + 81} - \frac{50 - 3a}{18a - 81 - a^2} - \frac{131 + 2a}{(9 - a)^2}$$

$$B) \frac{ad-bc}{2cd(c+d)} + \frac{ad+bc}{2cd(c-d)}$$

$$\Gamma) \frac{(5v+2t)^2}{5v-2t} + \frac{(5v-2t)^2}{5v+2t}$$

e) 
$$\frac{c+6b}{ac+2bc-6ab-3a^2} + \frac{2b}{a^2+2ab} - \frac{b}{ac-3a^2}$$

ж) 
$$\frac{t^2(x-y)(y-z)+y^2(z-t)(x-t)}{z^2(x-y)(x-t)+x^2(y-z)(z-t)}$$

3) 
$$\left( \left( \frac{4a}{(a-b)^3} - \frac{a}{a^3 - b^3} \right) \cdot \left( \frac{a-b}{a+b} \right)^3 - \frac{3}{a^2 - b^2} \right) : \frac{3b^2}{a^6 - b^6}$$

и) 
$$\left(\frac{x-2y}{3xy+6y^2}-x^2+2y\right)\cdot\frac{x+2y}{x^2-2xy}+\frac{6xy^2-1}{3xy}$$

$$\text{ K) } \frac{a+7}{a+2}: \left(\frac{9(a+2)}{3a+13} - \frac{(2a-1)^2}{3a^2+19a+26}\right) - \frac{2}{a+1}$$

a) 
$$\frac{(5x-1)^3}{5x-3} + \frac{-1+15x}{3-5x}$$

6) 
$$\frac{x^3 + 50}{10x - x^2 - 25} + \frac{2x^2}{(x - 5)^2} + \frac{25x}{(5 - x)^2}$$

B) 
$$\frac{9m^2 - 12mn + 16n^2}{3m - 4n} + \frac{9m^2 + 12mn + 16n^2}{3m + 4n}$$

r) 
$$\frac{(4v-q)^2}{4q-v} + \frac{(4q-v)^2}{4v-q}$$

д) 
$$\frac{2a+3c}{4a+2c} - \frac{2b-3a}{9a+3b} + \frac{6a^2-bc}{6a^2+2ab+3ac+bc}$$

e) 
$$\frac{(b-c)^2}{(a-b)(c-a)} + \frac{(a-c)^2}{(a-b)(b-c)} + \frac{(a-b)^2}{(c-a)(b-c)}$$

ж) 
$$\left(\frac{4z^3}{(z+2)^3} - \frac{z^3}{z^3+8}\right) : \left(\frac{z-2}{z+2}\right)^2 - \frac{2(z^3-4)}{z^3+8}$$

3) 
$$\left(\frac{x+4y}{\frac{16x^2}{4y-x}+4y+7x}-\frac{1}{1+\frac{8x(x+4y)}{(x-4x)^2}}\right):\frac{4y-x}{(3x+4y)^2}$$

и) 
$$\frac{y+1}{x^2-x+2xy-y+y^2} + \frac{x+y}{xy-x+y^2-2y+1} - \frac{y^2}{(x+y)(y-1)(x+y-1)}$$

$$\mathsf{K}) \ \frac{1}{(x-1)^2} + \frac{x+11}{x^3 - 3x^2 - 6x + 8} : \left(\frac{x-4}{2x^2 + x - 6} - \frac{9}{8 + 2x - x^2}\right)$$