Ovo nisu svi zadaci iz ove zbirke ,
Ovo je samo manji dio od oko 12% zadataka iz kompletne zbirke …
I ovdje su postavljeni samo kao ogledni primjerci ….
Ali vam mogu poslužiti kao solidna vježba pred testove ili ispitivanja u školi …

201.

16) $\dfrac{a^2+b^2}{a^4-b^4} = \dfrac{a^2+b^2}{\left(a^2-b^2\right)\left(a^2+b^2\right)} = \dfrac{1.\cancel{\left(a^2+b^2\right)}}{\left(a^2-b^2\right)\cancel{\left(a^2+b^2\right)}} = \dfrac{1}{a^2-b^2}$

$\downarrow$

$a^4-b^4 = \underbrace{\left(a^2\right)^2-\left(b^2\right)^2}_{\text{razlika kvadrata !}} = \left(a^2-b^2\right)\left(a^2+b^2\right)$

$\uparrow$

17) $\dfrac{a^2-b^2}{a^4-b^4} = \dfrac{a^2-b^2}{\left(a^2-b^2\right)\left(a^2+b^2\right)} = \dfrac{1.\cancel{\left(a^2-b^2\right)}}{\cancel{\left(a^2-b^2\right)}\left(a^2+b^2\right)} = \dfrac{1}{a^2+b^2}$

19) $\dfrac{x-y}{\left(y-x\right)^2} = \dfrac{x-y}{\left(x-y\right)^2} = \dfrac{x-y}{\left(x-y\right)\cdot\left(x-y\right)} = \dfrac{1\cdot\cancel{\left(x-y\right)}}{\cancel{\left(x-y\right)}\cdot\left(x-y\right)} = \dfrac{1}{x-y}$

$\downarrow \qquad \uparrow$

$\left(a-b\right)^2 = \left(b-a\right)^2$ sjetimo se ovog pravila (pogledaj u naše formule !!)

20) $\dfrac{x^2y-xy^2}{3x^2y^2-3xy^3} = \dfrac{x\cdot x\cdot y - x\cdot y\cdot y}{3\cdot x\cdot x\cdot y^2 - 3\cdot x\cdot y^2\cdot y^1} =$

$= \dfrac{\underline{x}\cdot x\cdot \underline{y} - \underline{x}\cdot y\cdot \underline{y}}{\underline{3}\cdot \underline{x}\cdot x\cdot \underline{y^2} - \underline{3}\cdot \underline{x}\cdot \underline{y^2}\cdot y^1} =$

$= \dfrac{x\cdot y\cdot\left(x-y\right)}{3\cdot x\cdot y^2\cdot\left(x-y\right)} = \dfrac{1\cdot \cancel{x}\cdot \cancel{y}\cdot \cancel{\left(x-y\right)}}{3\cdot \cancel{x}\cdot y\cdot \cancel{y}\cdot \cancel{\left(x-y\right)}} =$

$= \dfrac{1}{3y}$

ili kraće :

$\dfrac{x^2y-xy^2}{3x^2y^2-3xy^3} = \dfrac{x\cdot y\cdot\left(x-y\right)}{3\cdot x\cdot y^2\cdot\left(x-y\right)} = \dfrac{1\cdot \cancel{x}\cdot \cancel{y}\cdot \cancel{\left(x-y\right)}}{3\cdot \cancel{x}\cdot y\cdot \cancel{y}\cdot \cancel{\left(x-y\right)}} = \dfrac{1}{3y}$

202.

3) $\dfrac{a+b}{a^3+b^3} = \dfrac{a+b}{(a+b)(a^2-ab+b^2)} = \dfrac{{}^{1}\cancel{(a+b)}}{\cancel{(a+b)}(a^2-ab+b^2)} = \dfrac{1}{a^2-ab+b^2}$

$\downarrow$

treba prepoznati formulu za zbroj kubova

4) $\dfrac{x^2-xy}{y^2-xy} = \dfrac{x\cdot x - x\cdot y}{y\cdot y - x\cdot y} =$

$= \dfrac{x\cdot(x-y)}{y\cdot(y-x)} = \dfrac{x\cdot(-y+x)}{y\cdot(y-x)} = \dfrac{x\cdot(-1)\cdot(y-x)}{y\cdot(y-x)} = \dfrac{x\cdot(-1)\cdot\cancel{(y-x)}}{y\cdot\cancel{(y-x)}} = x\cdot(-1) = -x$

6) $\dfrac{(x-y)^2}{x^2-y^2} = \dfrac{(x-y)(x-y)}{(x-y)(x+y)} = \dfrac{\cancel{(x-y)}(x-y)}{\cancel{(x-y)}(x+y)} = \dfrac{x-y}{x+y}$

9) $\dfrac{x^2-y^2}{x^3+y^3} = \dfrac{(x-y)(x+y)}{(x+y)(x^2-xy+y^2)} = \dfrac{(x-y)\cancel{(x+y)}}{\cancel{(x+y)}(x^2-xy+y^2)} = \dfrac{x-y}{x^2-xy+y^2}$

$\downarrow$

zbroj kubova

203.

6.) $\dfrac{x^6-y^6}{x^2-y^2}=\dfrac{\left(x^3\right)^2-\left(y^3\right)^2}{(x-y)(x+y)}=\dfrac{\left(x^3-y^3\right)\left(x^3+y^3\right)}{(x-y)(x+y)}=$

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

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

$$=\left(x^2+xy+y^2\right)\left(x^2-xy+y^2\right)=$$

$$=\left(x^2+y^2+xy\right)\left(x^2+y^2-xy\right)=$$

$$=\left(x^2+y^2\right)^2-(xy)^2=$$

$$=\left(x^2\right)^2+2\cdot x^2\cdot y^2+\left(y^2\right)^2-x^2y^2=$$

$$=x^4+2x^2y^2+y^4-x^2y^2=x^4+2x^2y^2-1\cdot x^2y^2+y^4=x^4+x^2y^2+y^4$$

8.) $\dfrac{(x-y)^2-1}{x^2-x-y^2-y}=\dfrac{(x-y)^2-1^2}{x^2-y^2-x-y}=\dfrac{(x-y-1)(x-y+1)}{(x-y)\cdot(x+y)-1\cdot(x+y)}=\dfrac{(x-y-1)(x-y+1)}{(x+y)\cdot(x-y-1)}=$

$$=\frac{\cancel{(x-y-1)}(x-y+1)}{(x+y)\cdot\cancel{(x-y-1)}}=\frac{x-y+1}{x+y}$$

uputa: $(x-y)^2-1=(x-y)^2-1^2=(\text{to je razlika kvadrata }\ldots.)=(x-y-1)(x-y+1)$

204.

1) $\dfrac{x^2y}{x^2-x^2y}=\dfrac{x^2\cdot y}{x^2\cdot 1-x^2\cdot y}=\dfrac{x^2\cdot y}{x^2\cdot(1-y)}=\dfrac{\cancel{x^2}\cdot y}{\cancel{x^2}\cdot(1-y)}=\dfrac{y}{1-y}$

5) $\dfrac{4x^2y-4xy^2}{2x^2y-2xy^2}=\dfrac{4\cdot x\cdot x\cdot y-4\cdot x\cdot y\cdot y}{2\cdot x\cdot x\cdot y-2\cdot x\cdot y\cdot y}=\dfrac{4\cdot x\cdot y\cdot(x-y)}{2\cdot x\cdot y\cdot(x-y)}=\dfrac{2\cdot\cancel{2}\cdot\cancel{x}\cdot\cancel{y}\cdot\cancel{(x-y)}}{\cancel{2}\cdot\cancel{x}\cdot\cancel{y}\cdot\cancel{(x-y)}}=\dfrac{2}{1}=2$

ili kraće:

$\dfrac{4x^2y-4xy^2}{2x^2y-2xy^2}=\dfrac{4\cdot x\cdot y\cdot(x-y)}{2\cdot x\cdot y\cdot(x-y)}=\dfrac{2\cdot\cancel{2}\cdot\cancel{x}\cdot\cancel{y}\cdot\cancel{(x-y)}}{\cancel{2}\cdot\cancel{x}\cdot\cancel{y}\cdot\cancel{(x-y)}}=\dfrac{2}{1}=2$

205.

7) $\dfrac{a^4b-a^2b^3}{a^5b-ab^5}=\dfrac{a^2\cdot a^2\cdot b^1-a^2\cdot b^1\cdot b^2}{a^1\cdot a^4\cdot b^1-a^1\cdot b^1\cdot b^4}=$

$=\dfrac{a^2\cdot b^1\cdot(a^2-b^2)}{a^1\cdot b^1\cdot(a^4-b^4)}=\dfrac{a\cdot a\cdot b\cdot(a^2-b^2)}{a\cdot b\cdot(a^2-b^2)(a^2+b^2)}=\dfrac{\cancel{a}\cdot a\cdot\cancel{b}\cdot\cancel{(a^2-b^2)}}{\cancel{a}\cdot\cancel{b}\cdot\cancel{(a^2-b^2)}(a^2+b^2)}=\dfrac{a}{a^2+b^2}$

dodatna uputa :

$\dfrac{a^4b-a^2b^3}{a^5b-ab^5}=\dfrac{a^{2+2}\cdot b^1-a^2\cdot b^{1+1}}{a^{1+4}\cdot b^1-a\cdot b^{1+4}}=$

$=\dfrac{\underline{a^2}\cdot a^2\cdot\underline{b^1}-\underline{a^2}\cdot\underline{b^1}\cdot b^2}{\underline{a^1}\cdot a^4\cdot\underline{b^1}-\underline{a^1}\cdot\underline{b^1}\cdot b^4}=$ u brojniku i nazivniku podvučemo zajedničke faktore

$=\dfrac{a^2\cdot b^1\cdot(a^2-b^2)}{a^1\cdot b^1\cdot(a^4-b^4)}=$ izlučimo z.f. i u brojniku i u nazivniku

$=\dfrac{a\cdot a\cdot b\cdot(a^2-b^2)}{a\cdot b\cdot(a^2-b^2)(a^2+b^2)}=$ u nazivniku treba prepoznati razliku kvadrata

$=\dfrac{\cancel{a}\cdot a\cdot\cancel{b}\cdot\cancel{(a^2-b^2)}}{\cancel{a}\cdot\cancel{b}\cdot\cancel{(a^2-b^2)}(a^2+b^2)}=$ kratimo

$=\dfrac{a}{a^2+b^2}$

206.

10) $\dfrac{(x-3)^2}{(3-x)^3} = \dfrac{(x-3)(x-3)}{(3-x)(3-x)(3-x)} = \dfrac{(x-3)(x-3)}{(-x+3)(-x+3)(3-x)} = \dfrac{(x-3)(x-3)}{-1\cdot(x-3)\cdot(-1)(x-3)\cdot(3-x)} =$

$= \dfrac{(x-3)(x-3)}{(x-3)(x-3)(3-x)} = \dfrac{1\cdot \cancel{(x-3)}\,\cancel{(x-3)}}{\cancel{(x-3)}\,\cancel{(x-3)}\,(3-x)} = \dfrac{1}{3-x}$

11) $\dfrac{x^3+y^3}{(x+y)^3} = ?$

12) $\dfrac{x^3-y^3}{(x-y)^3} = \dfrac{(x-y)(x^2+xy+y^2)}{(x-y)^{1+2}} =$

$= \dfrac{(x-y)(x^2+xy+y^2)}{(x-y)^1\cdot(x-y)^2} = \dfrac{\cancel{(x-y)}\,(x^2+xy+y^2)}{\cancel{(x-y)}\cdot(x-y)^2} = \dfrac{x^2+xy+y^2}{(x-y)^2}$

208.

9) $\dfrac{x^2-y^2}{x^4-y^4}=\dfrac{x^2-y^2}{\left(x^2\right)^2-\left(y^2\right)^2}=\dfrac{x^2-y^2}{\left(x^2-y^2\right)\left(x^2+y^2\right)}=\dfrac{\overset{1}{\cancel{\left(x^2-y^2\right)}}}{\cancel{\left(x^2-y^2\right)}\left(x^2+y^2\right)}=\dfrac{1}{x^2+y^2}$

12) $\dfrac{1-x^2}{x^2-2x+1}=\dfrac{1^2-x^2}{x^2-2x+1^2}=$

$$=\frac{(1-x)(1+x)}{(x-1)^2}=\frac{(1-x)(x+1)}{(1-x)^2}=\frac{(1-x)(x+1)}{(1-x)(1-x)}=\frac{\cancel{(1-x)}(x+1)}{\cancel{(1-x)}(1-x)}=\frac{x+1}{1-x}$$

$$\downarrow \qquad \uparrow$$

pravilo kaže: $(a-b)^2 \quad = \quad (b-a)^2$

15) $\dfrac{x^2-x}{(1-x)^2}=\dfrac{x\cdot x-1\cdot x}{(x-1)^2}=\dfrac{x\cdot(x-1)}{(x-1)(x-1)}=\dfrac{x\cdot\cancel{(x-1)}}{(x-1)\cancel{(x-1)}}=\dfrac{x}{x-1}$

$\downarrow \qquad \uparrow$

pravilo: $(a-b)^2=(b-a)^2$

209.

8) $\dfrac{x^3y+2x^2y+xy}{x^3y-xy}=\dfrac{x^1\cdot x^2\cdot y+2\cdot x^1\cdot x^1\cdot y+x^1\cdot y\cdot 1}{x^1\cdot x^2\cdot y-x^1\cdot y\cdot 1}=$

$$=\frac{x^1\cdot y\cdot\left(x^2+2\cdot x+1\right)}{x^1\cdot y\cdot\left(x^2-1\right)}=\frac{\cancel{x\cdot y}\cdot(x+1)^2}{\cancel{x\cdot y}\cdot\left(x^2-1^2\right)}=\frac{(x+1)(x+1)}{(x-1)(x+1)}=\frac{(x+1)\cancel{(x+1)}}{(x-1)\cancel{(x+1)}}=\frac{x+1}{x-1}$$

210.

1) $\dfrac{(x-3)^2+12x}{x^2-9}=\dfrac{x^2-2\cdot x\cdot 3+3^2+12x}{x^2-3^2}=$ $\rightarrow$ pogledati u 57. zadatak kako se to radi ...

$$=\frac{x^2-6x+12x+3^2}{(x-3)(x+3)}=$$

$$=\frac{x^2+6x+3^2}{(x-3)(x+3)}=\frac{(x+3)^2}{(x-3)(x+3)}=\frac{(x+3)\cancel{(x+3)}}{(x-3)\cancel{(x+3)}}=\frac{x+3}{x-3}$$

4) $\dfrac{(x+2)^2-8x}{x^2-5x-6}=\dfrac{x^2+4x+4-8x}{x^2-3x-2x-6}=\dfrac{x^2+4x-8x+4}{x\cdot x-3\cdot x-2\cdot x-2\cdot 3}=$

$$=\frac{x^2-4x+4}{x\cdot(x-3)-2\cdot(x-3)}=\frac{(x-2)^2}{(x-3)(x-2)}=\frac{(x-2)\cancel{(x-2)}}{(x-3)\cancel{(x-2)}}=\frac{x-2}{x-3}$$

uputa uz ovaj zadatak :

$x^2-5x-6\rightarrow$ je kvadratni trinom ...

tehnika kako se taj izraz rješava na faktore objašnjena je u 66. zadatku ove zbirke !

211.

9) $$\frac{x^2+y^2-z^2+2xy}{x^2+xz+xy-y-x-z}=\frac{x^2+2xy+y^2-z^2}{x\cdot(x+z+y)-(y+x+z)}=\frac{(x+y)^2-z^2}{x\cdot(x+y+z)-1\cdot(y+x+z)}=$$

$$=\frac{(x+y-z)(x+y+z)}{(x+y+z)\cdot(x-1)}=\frac{(x+y-z)\cancel{(x+y+z)}}{\cancel{(x+y+z)}\cdot(x-1)}=\frac{x+y-z}{x-1}$$

212.

1) $$\frac{x^8-y^8}{x^3+xy^2-x^2y-y^3}=\frac{(x^4)^2-(y^4)^2}{x^1\cdot x^2+x\cdot y^2-y\cdot x^2-y^1\cdot y^2}=$$

$$=\frac{(x^4-y^4)(x^4+y^4)}{x\cdot(x^2+y^2)-y\cdot(x^2+y^2)}=$$

$$=\frac{\left[(x^2)^2-(y^2)^2\right](x^4+y^4)}{(x^2+y^2)(x-y)}$$

$$=\frac{(x^2-y^2)(x^2+y^2)(x^4+y^4)}{(x^2+y^2)(x-y)}=\frac{(x^2-y^2)\cancel{(x^2+y^2)}(x^4+y^4)}{\cancel{(x^2+y^2)}(x-y)}=$$

$$=\frac{(x^2-y^2)(x^4+y^4)}{(x-y)}=\frac{\cancel{(x-y)}(x+y)(x^4+y^4)}{\cancel{(x-y)}}=$$

$$=(x+y)(x^4+y^4)$$

213.

U ovom zadatku se ponovo susrečemo sa KVADRATNIM TRINOMOM
u zadatku br. 66. smo dali detaljnu uputu kako se kvadratni trinom rastavlja na faktore ....

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

$$=\frac{(x-2)(x+2)}{x\cdot(x-2)+1\cdot(x-2)}=\frac{(x-2)(x+2)}{(x-2)(x+1)}=\frac{\cancel{(x-2)}\,(x+2)}{\cancel{(x-2)}\,(x+1)}=\frac{x+2}{x+1}$$

$\Updownarrow$

uputa kako rastaviti
kvadratni trinom iz brojnika:

$$x^2-x-2=\begin{vmatrix}a=1\\b=-1\\c=-2\end{vmatrix}\Rightarrow\left.\begin{matrix}m+n=b\\m\cdot n=a\cdot c\end{matrix}\right\}\Rightarrow\left.\begin{matrix}m+n=-1\\m\cdot n=1\cdot(-2)\end{matrix}\right\}\Rightarrow\left.\begin{matrix}m+n=-1\\m\cdot n=-2\end{matrix}\right\}\Rightarrow m=-2,\ n=1$$

$m=-2\quad,\quad n=1$

$$x^2-x-2=x^2-2x+1x-2=$$
$$=x(x-2)-1(x-2)=$$
$$=x(\underline{x-2})-1(\underline{x-2})=$$
$$=(x-2)(x-1)$$

2) $$\frac{4x^2-4x+1}{2x^2-5x+2}=\frac{2^2\cdot x^2-2\cdot 2x\cdot 1+1^2}{2x^2-4x-1x+2}=\frac{(2x)^2-2\cdot 2x\cdot 1+1^2}{2\cdot x\cdot x-2\cdot 2\cdot x-1\cdot x+2}=\frac{(2x-1)^2}{2x\cdot(x-2)-1\cdot(x-2)}=$$

$$=\frac{(2x-1)(2x-1)}{(x-2)(2x-1)}=\frac{(2x-1)\,\cancel{(2x-1)}}{(x-2)\,\cancel{(2x-1)}}=\frac{2x-1}{x-2}$$

$\Updownarrow$

uputa kako rastaviti
kvadratni trinom iz brojnika:

$$2x^2-5x+2=\begin{vmatrix}a=2\\b=-5\\c=2\end{vmatrix}\Rightarrow\left.\begin{matrix}m+n=b\\m\cdot n=a\cdot c\end{matrix}\right\}\Rightarrow\left.\begin{matrix}m+n=-5\\m\cdot n=2\cdot 2\end{matrix}\right\}\Rightarrow\left.\begin{matrix}m+n=-5\\m\cdot n=4\end{matrix}\right\}\Rightarrow m=-4,\ n=-1$$

$m=-4\quad,\quad n=-1$

$$2x^2-5x+2=2x^2-4x-1x+2=$$
$$=2x(x-2)-1(x-2)=$$
$$=2x(\underline{x-2})-1(\underline{x-2})=$$
$$=(x-2)(2x-1)$$

214.

4) $\dfrac{x^3-x^2y+xy^2-x^3}{x^3+x^2y+xy^2+y^3}=\dfrac{x^2\cdot x^1-x^2\cdot y+x^1\cdot y^2-x^1\cdot x^2}{x^2\cdot x^1+x^2\cdot y+x\cdot y^2+y^2\cdot y^1}=$

$$=\frac{x^2\cdot(x-y)+x\cdot(y^2-x^2)}{x^2\cdot(x+y)+y^2\cdot(x+y)}=$$

$$=\frac{x\cdot x\cdot(x-y)+x\cdot(y-x)(y+x)}{(x+y)(x^2+y^2)}=\frac{x\cdot x\cdot(x-y)-x\cdot(x-y)(y+x)}{(x+y)(x^2+y^2)}=$$

$$=\frac{x\cdot(x-y)[x-(y+x)]}{(x+y)(x^2+y^2)}=$$

$$=\frac{x\cdot(x-y)(x-y-x)}{(x+y)(x^2+y^2)}=\frac{x\cdot(x-y)(-y)}{(x+y)(x^2+y^2)}=$$

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

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

215.

1) $\dfrac{a^x+a^{x+1}}{a^x-a^{x+1}}=\dfrac{a^x\cdot 1+a^x\cdot a^1}{a^x\cdot 1-a^x\cdot a^1}=\dfrac{a^x\cdot(1+a)}{a^x\cdot(1-a)}=\dfrac{\cancel{a^x}\cdot(1+a)}{\cancel{a^x}\cdot(1-a)}=\dfrac{1+a}{1-a}$

2) $\dfrac{a^x+a^{x+1}}{a^x-a^{x+1}}=\dfrac{a^x\cdot 1+a^x\cdot a^1}{a^x\cdot 1-a^x\cdot a^1}=\dfrac{a^x\cdot(1+a)}{a^x\cdot(1-a)}=\dfrac{1+a}{1-a}$

3) $\dfrac{a^{x+2}-a^x}{a^{x+1}+a^x}=\dfrac{a^x\cdot a^2-1\cdot a^x}{a^x\cdot a^1+1\cdot a^x}=$

$$=\frac{a^x\cdot(a^2-1)}{a^x\cdot(a+1)}=\frac{a^x\cdot(a-1)(a+1)}{a^x\cdot(a+1)}=\frac{\cancel{a^x}\cdot(a-1)\cancel{(a+1)}}{\cancel{a^x}\cdot\cancel{(a+1)}}=\frac{a-1}{1}=a-1$$

4) $\dfrac{a^{x+4}-a^x}{a^{x+3}-a^{x+2}+a^{x+1}-a^x}=\dfrac{a^x\cdot a^4-a^x\cdot 1}{a^x\cdot a^3-a^x\cdot a^2+a^x\cdot a^1-a^x\cdot 1}=\dfrac{a^x\cdot(a^4-1)}{a^x\cdot(a^3-a^2+a-1)}=$

$$=\frac{\cancel{a^x}\cdot(a^4-1)}{\cancel{a^x}\cdot(a^3-a^2+a-1)}=$$

$$=\frac{a^4-1}{a^3-a^2+a-1}=\frac{(a^2)^2-1^2}{a^2\cdot a^1-a^2\cdot 1+1\cdot(a-1)}=$$

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

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

$$=\frac{a+1}{1}=a+1$$

221.

4) $\frac{x-1}{xy^2}+\frac{1-y}{x^2y}=\frac{x-1}{x\cdot y\cdot y}+\frac{1-y}{x\cdot x\cdot y}=\frac{x\cdot(x-1)+y\cdot(1-y)}{x\cdot x\cdot y\cdot y}=\frac{x^2-x+y-y^2}{x^2y^2}=$

$=\frac{x^2-y^2-x+y}{x^2y^2}=\frac{(x-y)(x+y)-1\cdot(x-y)}{x^2y^2}=\frac{(x-y)(x+y-1)}{x^2y^2}$

5

7) $\frac{2}{x-3}-\frac{4}{x+3}+\frac{3x}{x^2-9}=\frac{2}{x-3}-\frac{4}{x+3}+\frac{3x}{x^2-9}=\frac{2}{x-3}-\frac{4}{x+3}+\frac{3x}{(x-3)(x+3)}=$

$=\frac{2(x+3)-4(x-3)+3x}{(x-3)(x+3)}=\frac{2x+6-4x+12+3x}{(x-3)(x+3)}=$

$=\frac{2x-4x+3x+6+12}{x^2-3^2}=\frac{x+18}{x^2-9}$

222.

2) $\dfrac{5x^2y^4z^4}{6a^3b^4c^5}\cdot\dfrac{18a^5b^4c}{25xy^2z^4}=\dfrac{5\cdot x\cdot x\cdot y^2\cdot y^2\cdot z^4}{6\cdot a^3\cdot b^4\cdot c^1\cdot c^4}\cdot\dfrac{6\cdot 3\cdot \cdot a^3\cdot a^2\cdot b^4\cdot c}{5\cdot 5\cdot x\cdot y^2\cdot z^4}=$

$=\dfrac{\cancel{5}\cdot\cancel{x}\cdot x\cdot\cancel{y^2}\cdot y^2\cdot\cancel{z^4}}{\cancel{6}\cdot\cancel{a^3}\cdot\cancel{b^4}\cdot\cancel{c^1}\cdot c^4}\cdot\dfrac{\cancel{6}\cdot 3\cdot\cancel{a^3}\cdot a^2\cdot\cancel{b^4}\cdot\cancel{c}}{\cancel{5}\cdot 5\cdot\cancel{x}\cdot\cancel{y^2}\cdot\cancel{z^4}}=$

$=\dfrac{xy^2\cdot 3\cdot a^2}{c^4\cdot 5}=\dfrac{3xy^2a^2}{5c^4}$

5) $\dfrac{x^3+y^3}{x-y}\cdot\dfrac{x^3-y^3}{x^2-xy+y^2}=\dfrac{(x+y)(x^2-xy+y^2)}{(x-y)}\cdot\dfrac{(x-y)(x^2+xy+y^2)}{x^2-xy+y^2}=$

$=\dfrac{(x+y)\cancel{(x^2-xy+y^2)}}{\cancel{(x-y)}}\cdot\dfrac{\cancel{(x-y)}(x^2+xy+y^2)}{\cancel{(x^2-xy+y^2)}}=(x+y)(x^2+xy+y^2)$

225.

4) $\dfrac{x^2+4x+4}{x^2-y^2} : \dfrac{x^2-4}{x^2-2xy+y^2} = \dfrac{x^2+2\cdot 2\cdot x+2^2}{(x-y)(x+y)} \cdot \dfrac{x^2-2xy+y^2}{x^2-2^2} = \dfrac{(x+2)^2}{(x-y)(x+y)} \cdot \dfrac{(x-y)^2}{(x-2)(x+2)} =$

$$= \frac{(x+2)\cancel{(x+2)}}{\cancel{(x-y)}(x+y)} \cdot \frac{\cancel{(x-y)}(x-y)}{(x-2)\cancel{(x+2)}} = \frac{(x+2)(x-y)}{(x+y)(x-2)}$$

5) $\dfrac{(x-1)^2-y^2}{(x+1)^2-y^2} : \dfrac{x^2-x-xy}{x^2+x-xy} = \dfrac{(x-1-y)(x-1+y)}{(x+1-y)(x+1+y)} \cdot \dfrac{x^2+x-xy}{x^2-x-xy} =$

$$= \frac{(x-1-y)(x-1+y)}{(x+1-y)(x+1+y)} \cdot \frac{x\cdot(x+1-y)}{x\cdot(x-1-y)} =$$

$$= \frac{\cancel{(x-1-y)}(x-1+y)}{\cancel{(x+1-y)}(x+1+y)} \cdot \frac{\cancel{(x+1-y)}}{\cancel{(x-1-y)}} =$$

$$= \frac{x-1+y}{x+1+y} = \frac{x+y-1}{x+y+1}$$

8) $\left(\dfrac{x-y}{x+y}+\dfrac{x+y}{x+y}\right) : \dfrac{x^3+xy^2}{x^3-xy^2} = \dfrac{(x-y)(x-y)+(x+y)(x+y)}{(x+y)\cdot(x-y)} \cdot \dfrac{x^3-xy^2}{x^3+xy^2} =$

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

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

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

79.

Tehnika rješavanja ovog zadatka je sljedeća: brojnik i nazivnik rastavimo na faktore i kratimo...

1.) $$\frac{xy}{x-xy}=\frac{x\cdot y}{x\cdot(1-y)}=\frac{\cancel{x}\cdot y}{\cancel{x}\cdot(1-y)}=\frac{y}{1-y}$$

-rastavimo na faktore, kratimo x u brojniku i nazivniku

Ovi prvi zadaci su jednostavni, samorastavimo na faktore i kratimo

2.) $$\frac{ab^3}{a^2b-ab^2}=\frac{a\cdot b\cdot b^2}{a\cdot a\cdot b-a\cdot b\cdot b}=\frac{a\cdot b\cdot b^2}{a\cdot b\cdot(a-b)}=\text{kratimo:}\frac{\cancel{a}\cdot\cancel{b}\cdot b^2}{\cancel{a}\cdot\cancel{b}\cdot(a-b)}=\frac{b^2}{a-b}$$

3.) $$\frac{ax-bx}{ax+bx}=\frac{x\cdot(a-b)}{x\cdot(a+b)}=\frac{\cancel{x}\cdot(a-b)}{\cancel{x}\cdot(a+b)}=\frac{a-b}{a+b}$$

kratimo

4.) $$\frac{xz-yz}{z^2+3z}=\frac{z\cdot(x-y)}{z\cdot(z+3)}=\frac{\cancel{z}\cdot(x-y)}{\cancel{z}\cdot(z+3)}=\frac{x-y}{z+3}$$

kratimo

5.) $$\frac{a^2+a}{ax-ay}=\frac{a\cdot a+a}{a\cdot(x-y)}=\frac{a\cdot(a+1)}{a\cdot(x-y)}=\frac{\cancel{a}\cdot(a+1)}{\cancel{a}\cdot(x-y)}=\frac{a+1}{x-y}$$

6.) $$\frac{a^2-2ab}{ab-2b^2}=\frac{a\cdot a-2\cdot a\cdot b}{a\cdot b-2\cdot b\cdot b}=\frac{a\cdot(a-2b)}{b\cdot(a-2b)}=\frac{a\cdot\cancel{(a-2b)}}{b\cdot\cancel{(a-2b)}}=\frac{a}{b}$$

7.) $$\frac{3a^2+4ab}{9a^2b-16b^3}=\frac{a\cdot(3a+4b)}{b\underbrace{(9a^2-16b^2)}_{R.KVADRATA}}=\frac{a(3a+4b)}{b(3a-4b)(3a+4b)}=\frac{a}{b(3a-4b)}$$

8.) $$\frac{16x^3-36xy^2}{6xy-9y^2}=\frac{4x\overbrace{(4x^2-9y^2)}^{R.KVADRATA}}{3y(2x-3y)}=\frac{4x(2x-3y)(2x+3y)}{3y(2x-3y)}=\frac{4x(2x+3y)}{3y}$$

kratimo

10. $\dfrac{12a^5-27a^3b^2}{8a^3b-12a^2b^2}=\dfrac{3a^3(4a^2-b^2)}{4a^2b(2a-3b)}=\dfrac{3a(2a-3b)(2a+3b)}{4b(2a-3b)}=\dfrac{3a(2a+3b)}{4b}$

kratimo a^2 sa a^3 kratimo

još jednom isti zadatak:

$$\frac{12a^5-27a^3b^2}{8a^3b-12a^2b^2}=\frac{3a^3(4a^2-b^2)}{4a^2b(2a-3b)}=$$

$$=\frac{3\cdot a^2\cdot a\cdot\left(4a^2-b^2\right)}{4\cdot a^2\cdot b\cdot(2a-3b)}=\frac{3\cdot \cancel{a^2}\cdot a\cdot\left(4a^2-b^2\right)}{4\cdot \cancel{a^2}\cdot b\cdot(2a-3b)}=$$

$$=\frac{3a(2a-3b)(2a+3b)}{4b(2a-3b)}=\frac{3a\,\cancel{(2a-3b)}\,(2a+3b)}{4b\,\cancel{(2a-3b)}}=$$

$$=\frac{3a(2a+3b)}{4b}$$

11. $\dfrac{2a^4-8a^3b+8a^2b^2}{a^4-2a^3b}=\dfrac{2a^2(a^2-4ab+4b^2)}{a^3(a-2b)}=$ treba prepoznati kvadrat razlike

$$=\frac{2\cdot \cancel{a^2}\cdot(a-2b)^2}{\cancel{a^2}\cdot a\cdot(a-2b)}=$$ rastavimo: $(a-2b)^2=(a-2b)\cdot(a-2b)$

$$=\frac{2\cdot(a-2b)\cdot\cancel{(a-2b)}}{a\cdot\cancel{(a-2b)}}=$$

$$=\frac{2(a-2b)}{a}$$

12. $\dfrac{a^2-6a+9}{a^2-9}=\dfrac{(a-3)^2}{(a-3)(a+3)}=\dfrac{\cancel{(a-3)}\cdot(a-3)}{\cancel{(a-3)}\cdot(a+3)}=\dfrac{(a-3)}{(a+3)}$

13. $\dfrac{a^2-4}{a^2+a-6}=\dfrac{(a-2)(a+2)}{(a-2)(a+3)}=\dfrac{\cancel{(a-2)}\,(a+2)}{\cancel{(a-2)}\,(a+3)}=\dfrac{a+2}{a+3}$

$\downarrow$

$a^2+a-6=a^2+3a-2a-6^2-a(a+3)-2(a+3)=(a+3)(a-2)$

14. $\dfrac{a^2-b^2}{a^3+b^3}=\dfrac{(a-b)(a+b)}{(a+b)\left(a^2-ab+b^2\right)}=\dfrac{(a-b)\,\cancel{(a+b)}}{\cancel{(a+b)}\left(a^2-ab+b^2\right)}=\dfrac{a-b}{a^2-ab+b^2}$

17.) $$\frac{a^2-b^2}{a^3+ab^2-a^2b-b^3}=\frac{(a-b)(a+b)}{a^3-a^2b+ab^2-b^3}=$$

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

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

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

$$=\frac{(a-b)(a+b)}{(a-b)(a+b)-(a+b)}=$$

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

$$=\frac{a-b}{a-b-1}$$

19.)

$$\frac{\overbrace{a^2+2ab+b^2}^{KV.ZBROJA}-c^2}{(a+b+c)a+(a+b+c)c}=\frac{\overbrace{(a+b)^2-c^2}^{R.KV.}}{(a+b+c)(a+c)}=$$

$$=\frac{(a+b-c)(a+b+c)}{(a+b+c)(a+c)}=\quad \text{kratimo}$$

$$=\frac{a+b-c}{a+c}$$

20.) $$\frac{a^2+b^2-c^2+2ab}{a^2-b^2+c^2+2ac}=\frac{a^2+2ab+b^2-c^2}{a^2+2ac+c^2-b^2}=$$

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

$$=\frac{(a+b-c)(a+b+c)}{(a+c-b)(a+b+c)}=$$

$$=\frac{(a+b-c)(a+b+c)}{(a-b+c)(a+b+c)}=\frac{(a+b-c)\cancel{(a+b+c)}}{(a-b+c)\cancel{(a+b+c)}}=$$

$$=\frac{a+b-c}{a-b+c}$$

21.) $$\frac{a^2+6a+5}{a^3+5a^2-a-5}=\frac{a^2+a+5a+5}{a^3-a+5a^2-5}=$$

$$=\frac{a(a+1)+5(a+1)}{a(a^2-1)+5(a^2-1)}=$$

$$=\frac{(a+1)(a+5)}{(a^2-1)(a+5)}=$$

$$=\frac{(a+1)(a+5)}{(a+1)(a-1)(a+5)}=\frac{\cancel{(a+1)}\,\cancel{(a+5)}}{\cancel{(a+1)}\,(a-1)\,\cancel{(a+5)}}=$$

$$=\frac{1}{a-1}$$

22.) $$\frac{x^2+2x+2}{(x+1)^4-1}=\frac{x^2+2x+2}{\left((x+1)^2-1\right)\left((x+1)^2+1\right)}=$$

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

$$=\frac{x^2+2x+2}{\left(x^2+2x\right)\left(x^2+2x+2\right)}=$$

$$=\frac{1\cdot\cancel{\left(x^2+2x+2\right)}}{\left(x^2+2x\right)\cancel{\left(x^2+2x+2\right)}}=$$

$$=\frac{1}{x^2+2x}=$$

$$=\frac{1}{x(x+2)}$$

23.) $$\frac{(2a)(a-1)^2-4(2a-3)}{(a+1)^2(a-3)}=\frac{(2a-3)\left((a-1)^2-4\right)}{(a+1)^2(a-3)}=$$

$$=\frac{(2a-3)(a-1-2)(a-1+2)}{(a+1)(a+1)(a-3)}=$$

$$=\frac{(2a-3)(a-3)(a+1)}{(2+1)(a+1)(a-3)}=$$

$$=\frac{2a-3}{a+1}$$

24.) $$\frac{\left(4a^2-4a+1\right)\left(a^2-2a-3\right)}{\left(a^2-6a+9\right)\left[a^2-1+a\left(a+1\right)\right]}=\frac{\left(2a-1\right)^2\left(a^2+a-3a-3\right)}{\left(a-3\right)^2\left[\left(a-1\right)\left(a+1\right)+a\left(a+1\right)\right]}=$$
$$=\frac{\left(2a-1\right)^2\left(a\left(a+1\right)-3\left(a+1\right)\right)}{\left(a-3\right)^2\left(a+1\right)\left(a-1+a\right)}=$$
$$=\frac{\left(2a+1\right)^2\left(a+1\right)\left(a-3\right)}{\left(a-3\right)^2\left(a+1\right)\left(2a-1\right)}=\frac{2a-1}{a-3}$$

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

26.) $$\frac{\left(a^2-b^2-c^2-2bc\right)\left(a+b-c\right)}{\left(a+b+c\right)\left(a^2-b^2+c^2-2ac\right)}=\frac{\left[a^2-\left(b^2+2bc+c^2\right)\right]\left(a+b-c\right)}{\left(a+b+c\right)\left(a^2-2ac+c^2-b^2\right)}=$$
$$=\frac{\left[a^2-\left(b+c\right)^2\right]\left(a+b-c\right)}{\left(a+b+c\right)\left[\left(a-c\right)^2-b^2\right]}=$$
$$=\frac{\left[a-\left(b+c\right)\right]\left(a+b+c\right)\left(a+b-c\right)}{\left(a+b+c\right)\left(a-c-b\right)\left(a-c+b\right)}=$$
$$=\frac{\left(a-b-c\right)\left(a+b-c\right)}{\left(a-b-c\right)\left(a+b-c\right)}=1$$

27.) $$\frac{a^2+b^2+c^2+2ab+2bc+2ac}{a^2-b^2-c^2-2bc}=\frac{\left(a+b+c\right)\left(a+b+c\right)}{a^2\left(b^2+2bc+c^2\right)}=\frac{\left(a+b+c\right)\left(a+b+c\right)}{a^2-\left(b+c\right)^2}=$$
$$=\frac{\left(a+b+c\right)\left(a+b+c\right)}{\left[a-\left(b+c\right)\right]\left(a+b+c\right)}=\frac{a+b+c}{a-b-c}$$

28.) $$\frac{x^2-3xy+xz+2y^2-2yz}{x^2-y^2+2yz-z^2}=\frac{x^2 2xy-xy+2y^2+z\left(x-2y\right)}{x^2-\left(y^2-2yz+z^2\right)}=$$
$$=\frac{x\left(x-2y\right)-y\left(x-2y\right)+z\left(x-2y\right)}{x^2-\left(y-z\right)^2}=$$
$$=\frac{\left(x-2y\right)\left(x-y+z\right)}{\left[x-\left(y-z\right)\right]\left(x+y-z\right)}=\frac{\left(x-2y\right)\left(x-y+z\right)}{\left(x-y+z\right)\left(x+y-z\right)}=\frac{x-2y}{x+y-z}$$

29.) $\dfrac{a^2-3ab+ac+2bc}{a^2-b^2+2bc-c^2}=\dfrac{a^2-2ab-ab+2b^2+ac-2bc}{a^2\left(b^2-2bc+c^2\right)}=\dfrac{a(a-2b)-b(a-2b)+c(a-2b)}{a^2-(b-c)^2}=$

$$=\frac{(a-2b)(a-b+c)}{\left[a-(b-c)\right](a+b-c)}=\frac{(a-2b)(a-b+c)}{(a-b+c)(a+b-c)}=\frac{a-2b}{a+b-c}$$

30.) $\dfrac{xy\cdot\left(a^2-b^2\right)+abx^2-aby^2}{abx^2+aby^2+xy\cdot\left(a^2+b^2\right)}=\dfrac{a^2x-y-b^2xy+abx^2-aby^2}{abx^2+aby^2+a^2xy+b^2xy}=\dfrac{a^2xy+abx^2-aby^2-b^2xy}{aby^2+b^2xy+abx^2+a^2xy}=$

$$=\frac{ax\cdot(ay+bx)-by\cdot(ay+bx)}{by\cdot(ay+bx)+ax\cdot(bx+ay)}=\frac{(ay+bx)\cdot(ax-by)}{(ay+bx)\cdot(by+ax)}=\frac{ax-by}{ax+by}$$

31.) $\dfrac{3a^2x^2+3b^2-6abx+9a^2x-9ab}{\left(a^3x^3-ab^2x\right)\cdot(ax-b+3a)}=\dfrac{3a^2x^2-6abx+3b^2+9a^2x-9ab}{ax\cdot(ax-b)\cdot(ax+b)\cdot(ax-b+3a)}=$

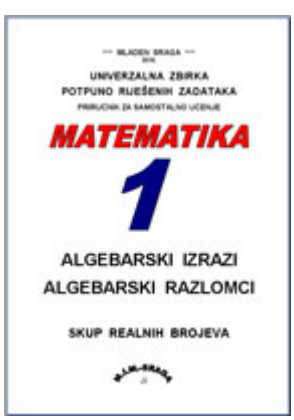
$$=\frac{3\cdot\left(a^2x^2-2abx+b^2\right)+9a\cdot(ax-b)}{ax\cdot(ax-b)\cdot(ax+b)\cdot(ax-b+3a)}=$$

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

$$=\frac{3\cdot(ax-b)\cdot(ax-b)+9a\cdot(ax-b)}{ax\cdot(ax-b)\cdot(ax+b)\cdot(ax-b+3a)}=$$

$$=\frac{(ax-b)\cdot\left(3.(ax-b)+9a\right)}{ax\cdot(ax-b)\cdot(ax+b)\cdot(ax-b+3a)}=$$

$$=\frac{3ax-3b+9a}{ax\cdot(ax+b)\cdot(ax-b+3a)}=$$



$$=\frac{3\cdot(ax-b+3a)}{ax\cdot(ax+b)\cdot(ax-b+3a)}=\frac{3}{ax\cdot(ax+b)}$$

32.) $$\frac{2x^3+3x^2y-2x-3y}{2x^2-2x+3y\cdot(x-1)}=\frac{2x^3-2x+3x^2y-3y}{2x\cdot(x-1)+3y\cdot(x-1)}=$$

$$=\frac{2x\cdot(x^2-1)+3y\cdot(x^2-1)}{(x-1)\cdot(2x+3y)}=$$

$$=\frac{(x^2-1)\cdot(2x+3y)}{(x-1)\cdot(2x+3y)}=$$

$$=\frac{(x-1)\cdot(x+1)}{(x-1)}=x+1$$

33.) $$\frac{3x^3+xy^2-6x^2y-2y^3}{9x^5-xy^4-18x^4y+2y^5}=\frac{3x^3-6x^2y+xy^2-2y^3}{9x^5-18x^4y-xy^4+2y^5}=$$

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

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

$$=\frac{(3x^2+y^2)}{(3x^2-y^2)\cdot(3x^2+y^2)}=$$

$$=\frac{1}{3x^2-y^2}$$

34.) $$\frac{ac+ad+bc+bd-a\cdot(c+d)}{ac^2-ad^2+bc^2-bd^2}=\frac{a\cdot(c+d)+b\cdot(c+d)-a\cdot(c+d)}{ac^2+bc^2-ad^2-bd^2}=$$

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

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

$$=\frac{(c+d)\cdot b}{(a+b)\cdot(c-d)\cdot(c+d)}=$$

$$=\frac{b}{(a+b)\cdot(c-d)}$$

79.

Skrati razlomke:

1.) $\frac{xy}{x-xy}=$ 2.) $\frac{ab^3}{a^2b-ab^2}=$ 3.) $\frac{ax-bx}{ax+bx}=$

4.) $\frac{xz-yz}{z^2+3z}=$ 5.) $\frac{a^2+a}{ax-ay}=$ 6.) $\frac{a^2-2ab}{ab-2b^2}=$

7.) $\frac{3a^2+4ab}{9a^2b-16b^3}=$ 8.) $\frac{16x^3-36xy^2}{6xy-9y^2}=$

10. $\frac{12a^5-27a^3b^2}{8a^3b-12a^2b^2}=$ 11. $\frac{2a^4-8a^3b+8a^2b^2}{a^4-2a^3b}=$

12. $\frac{a^2-6a+9}{a^2-9}=$ 13. $\frac{a^2-4}{a^2+a-6}=$ 14. $\frac{a^2-b^2}{a^3+b^3}=$

17.) $\frac{a^2-b^2}{a^3+ab^2-a^2b-b^3}=$ 18.) $\frac{a^2-b^2}{a^2-a-b-b^2}=$

19.) $\frac{a^2+2ab+b^2-c^2}{(a+b+c)a+(a+b+c)c}=$ 20.) $\frac{a^2+b^2-c^2+2ab}{a^2-b^2+c^2+2ac}=$

21.) $\frac{a^2+6a+5}{a^3+5a^2-a-5}=$ 22.) $\frac{x^2+2x+2}{(x+1)^4-1}=$

23.) $\frac{(2a)(a-1)^2-4(2a-3)}{(a+1)^2(a-3)}=$ 24.) $\frac{(4a^2-4a+1)(a^2-2a-3)}{(a^2-6a+9)[a^2-1+a(a+1)]}=$

25.) $\frac{x^2+4xy+4y^2-4}{x^24y^2-2(x-2y)}=$ 26.) $\frac{(a^2-b^2-c^2-2bc)(a+b-c)}{(a+b+c)(a^2-b^2+c^2-2ac)}=$

27.) $\frac{a^2+b^2+c^2+2ab+2bc+2ac}{a^2-b^2-c^2-2bc}=$ 28.) $\frac{x^2-3xy+xz+2y^2-2yz}{x^2-y^2+yz-z^2}=$

29.) $\frac{a^2-3ab+ac+2bc}{a^2-b^2+2bc-c^2}=$ 30.) $\frac{xy\cdot(a^2-b^2)+abx^2-aby^2}{abx^2+aby^2+xy\cdot(a^2+b^2)}=$