Vypočítajte:

1. $\dfrac{1}{4}+\dfrac{3}{5}$ $\qquad\qquad\qquad\qquad\qquad\left[\dfrac{17}{20}\right]$

2. $\dfrac{17}{8}-\dfrac{\frac{4}{9}}{\frac{24}{5}}$ $\qquad\qquad\qquad\qquad\left[\dfrac{439}{216}\right]$

Roznásobte:

3. $\left(2x+3y\right)^2$ $\qquad\qquad\qquad\left[4x^2+12xy+9y^2\right]$

4. $\left(2x+3y\right)^3$ $\qquad\qquad\qquad\left[8x^3+36x^2y+54xy^2+27y^3\right]$

5. $\left(2x-3y\right)^2$ $\qquad\qquad\qquad\left[4x^2-12xy+9y^2\right]$

6. $\left(2x-3y\right)^3$ $\qquad\qquad\qquad\left[8x^3-36x^2y+54xy^2-27y^3\right]$

Upravte na tvar súčinu:

7. x^2-4 $\qquad\qquad\qquad\qquad\left[(x-2)(x+2)\right]$

8. x^3-4x $\qquad\qquad\qquad\qquad\left[x(x-2)(x+2)\right]$

9. x^2-2 $\qquad\qquad\qquad\qquad\left[\left(x-\sqrt{2}\right)\left(x+\sqrt{2}\right)\right]$

10. x^3-8 $\qquad\qquad\qquad\qquad\left[(x-2)\left(x^2+2x+4\right)\right]$

11. x^5-8x^2 $\qquad\qquad\qquad\qquad\left[x^2(x-2)\left(x^2+2x+4\right)\right]$

Upravte výrazy a určte, kedy majú zmysel:

12. $\dfrac{2x^2.3x^3}{4x^4}$ $\qquad\qquad\qquad\left[\dfrac{3}{2}x\ ;\ \ x\neq0\right]$

13. $5x^{2n}\cdot 3x^n$ $\qquad\qquad\qquad\left[15x^{3n}\right]$

14. $x\left(x-y\right)^2 x^2\left(x-y\right)^3$ $\qquad\left[x^3(x-y)^5=x^8-5x^7y+10x^6y^2-10x^5y^3+5x^4y^4-x^3y^5\right]$

15. $\left(x^2y^2z\right)\left(3xzy^3\right)$ $\qquad\qquad\qquad\left[3x^3y^5z^2\right]$

16. $\dfrac{\left(2x^2y\right)^3\cdot\left(3xz^2y\right)^4}{8\left(2xy^2z\right)^5}$ $\qquad\qquad\left[\dfrac{81x^5z^3}{32y^3}\ ;\ \ x\neq0,y\neq0,z\neq0\right]$

17. $\dfrac{1}{4}\left(\dfrac{2^3\cdot5}{3\cdot4^2}\right):\left(\dfrac{5^2\cdot4}{3\cdot2^2}\right)^2$ $\qquad\qquad\left[\dfrac{3}{1000}\right]$

18. $\left(x^{m+n}y^{m-n}\right)\left(x^{m-n}y^{m+n}\right);m>n$ $\qquad\left[x^{2m}y^{2m}=\left(xy\right)^{2m}\right]$

19. $\dfrac{2-\sqrt{3}}{2+\sqrt{3}}$ $\qquad\qquad\qquad\left[7-4\sqrt{3}\right]$

20. $\dfrac{\frac{2}{\sqrt{2}+1}+\sqrt{2}-1}{\frac{2}{\sqrt{2}+1}-\frac{\sqrt{2}-1}{2}}$ $\qquad\qquad\qquad\left[2\right]$

21. $\left(1+\dfrac{x}{y}+\dfrac{y}{x}\right)^2$ $\qquad\left[\dfrac{x^4y^4+2x^3y+2xy^3+3x^2y^2}{x^2y^2}\ ;\ \ x\neq0,y\neq0\right]$

22. $\dfrac{x-y}{xy+x^2}\cdot\dfrac{x^4-y^4}{y^2-2xy+x^2}$ $\qquad\left[\dfrac{x^2+y^2}{x}\ ;\ \ x\neq0,y\neq\pm x\right]$

23. $\dfrac{x^2+xy+y^2}{x^2-y^2} \cdot \left(\dfrac{4x^3}{x^3-y^3} : \dfrac{2x^3}{x^2-2xy+y^2} \right)$ $\left[\dfrac{2}{x+y} \; ; \; x \neq 0, x \neq \pm y, x^2+xy+y^2 \neq 0 \right]$

24. $\dfrac{\dfrac{x^2-y^2}{x+y}}{\dfrac{x^2+2xy+y^2}{3y-3x}}$ $\left[\dfrac{-3(x-y)^2}{(x+y)^2} \; ; \; x \neq \pm y \right]$

25. $\dfrac{\dfrac{x}{y}+\dfrac{y}{x}}{\dfrac{y}{x}-\dfrac{x}{y}}$ $\left[\dfrac{x^2+y^2}{y^2-x^2} \; ; \; x \neq 0, y \neq 0, y \neq \pm x \right]$

26. $\sqrt{\sqrt[3]{x^{12}}}$ $\left[x^2 \right]$

27. $\sqrt{\dfrac{\sqrt[3]{x^2 y}}{xy}}$ $\left[x^{\frac{-1}{6}} y^{\frac{-1}{3}} = \dfrac{1}{\sqrt[6]{x} \cdot \sqrt[3]{y}} \; ; \; x > 0, y \neq 0 \right]$

28. $\sqrt[3]{x\sqrt{x}} \cdot \sqrt{x \cdot \sqrt[3]{x}}$ $\left[x^{\frac{7}{6}} = \sqrt[6]{x^7} \; ; \; x \geq 0 \right]$

29. $\dfrac{\sqrt{x}\,\sqrt[3]{x}\,\sqrt[4]{x^3}\,\sqrt[6]{x^5}}{x \cdot \sqrt[12]{x}}$ $\left[x^{\frac{4}{3}} = \sqrt[3]{x^4} \; ; \; x > 0 \right]$

Zapíšte bez použitia zlomkov:

30. $\dfrac{m}{s} \; ; \dfrac{kg}{m^3} \; ; \dfrac{J}{s} \; ; \dfrac{J}{kg \cdot K} \; ; \dfrac{N \cdot m^2}{kg^2} \; ; \dfrac{kg \cdot s^2}{m}$ $\left[m.s^{-1}; kg.m^{-3}; J.s^{-1}; J.kg^{-1}.K^{-1}; N.m^2.kg^{-2}; kg.s^2.m^{-1} \right]$

Vyjadrite premennú x v závislosti od ostatných premenných:

31. $y = 4x - 32$ $\left[x = \dfrac{y+32}{4} \right]$

32. $y^2 = 4x - 32$ $\left[x = \dfrac{y^2+32}{4} \right]$

33. $y = 4x^2 - 32$ $\left[x = \pm\sqrt{\dfrac{y+32}{4}} \right]$

34. $y = 4x^5 - 32$ $\left[x = \sqrt[5]{\dfrac{y+32}{4}} \right]$

35. $y = \dfrac{3}{x+5}$ $\left[x = \dfrac{3}{y} - 5 \right]$

36. $y^3 + 2 = \dfrac{4}{x+2}$ $\left[x = \dfrac{-2y^3}{y^3+2} = \dfrac{4}{y^3+2} - 2 \right]$

37. $y = \sqrt{x} + 2$ $\left[x = y^2 - 4y + 4 \right]$

38. $y = x + 2\sqrt{x} + 1$ $\left[x = y \pm 2\sqrt{y} + 1 \right]$

39. $\sqrt{y^5 - 6} = x^3 + 6x^2 + 12x + 8$ $\left[x = \sqrt[6]{y^5 - 6} - 2 \right]$

40. $x^2 - 4xy^3 + 4y^6 = 0$ $\left[x = 2y^3 \right]$