3.Bez Bruchterme Lösungen AB 10

1. $\frac{15a}{28b} \cdot \frac{35b^2}{33a} = \frac{5 \cdot 5b}{4 \cdot 11} = \underline{\underline{\frac{25b}{44}}}$

2. $15uv \cdot \left(-\frac{9v}{5u}\right) = -\frac{3v \cdot 9v}{1} = \underline{\underline{-27v^2}}$

3. $\frac{28x^2y}{25vw} : \frac{56xy^2}{125v^2w} = \frac{28x^2y \cdot 125v^2w}{25vw \cdot 56xy^2} = \frac{x \cdot 5v}{2y} = \underline{\underline{\frac{5vx}{2y}}}$

4. $\frac{19r^2s}{17t} : \frac{76r^2s^2}{51t^2} = \frac{19r^2s \cdot 51t^2}{17t \cdot 76r^2s^2} = \underline{\underline{\frac{3t}{4s}}}$

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

6. $\frac{3x+1}{2x-1} : \frac{x}{y} = \underline{\underline{\frac{y(3x+1)}{x(2x-1)}}}$

7. $\frac{3x-1}{5x} \cdot \frac{10x^2}{2x+1} = \frac{10x^2(3x-1)}{5x(2x+1)} = \underline{\underline{\frac{2x(3x-1)}{(2x+1)}}}$

8. $\frac{(a+b)^2}{(a-b)^2} : \frac{a^2+2ab+b^2}{a^2-2ab+b^2} = \frac{(a+b)^2}{(a-b)^2} : \frac{(a+b)(a+b)}{(a-b)(a-b)} = \frac{(a+b)^2(a-b)(a-b)}{(a-b)^2(a+b)(a+b)} = \underline{\underline{1}}$

9. $\frac{x^2-y^2}{15x} \cdot \frac{20y}{ux+uy} = \frac{(x+y)(x-y)}{15x} \cdot \frac{20y}{u(x+y)} = \underline{\underline{\frac{4y(x-y)}{3ux}}}$

10. $\frac{18a^2}{a^2+2ab+b^2} : \frac{21ab}{5a+5b} = \frac{18a^2 \cdot 5(a+b)}{(a+b)(a+b) \cdot 21ab} = \frac{6a \cdot 5}{(a+b) \cdot 7b} = \underline{\underline{\frac{30a}{7b(a+b)}}}$

11. $\frac{5u+5v}{uv-v^2} \cdot \frac{v^2}{u^2+2uv+v^2} = \frac{5(u+v) \cdot v^2}{v(u-v)(u+v)(u+v)} = \underline{\underline{\frac{5v}{(u-v)(u+v)}}}$

12. $\frac{(a+b)(a-b)}{(2a+2b)(2a-2b)} \cdot \frac{4ab}{a(b+1)} = \frac{(a+b)(a-b) \cdot 4ab}{2(a+b) \cdot 2(a-b) \cdot a(b+1)} = \underline{\underline{\frac{b}{(b+1)}}}$

13. $\frac{3(x+y)}{z} : 12(x+y) = \frac{3(x+y)}{z \cdot 12(x+y)} = \underline{\underline{\frac{1}{4z}}}$

14. $\frac{3c^2}{4ab+4ac} \cdot (10b+10c) = \frac{3c^2 \cdot 10(b+c)}{4a(b+c)} = \frac{3c^2 \cdot 5}{2a} = \underline{\underline{\frac{15c^2}{2a}}}$

15. $(3u^2+6uv+3v^2) : \frac{3u^2-3v^2}{2uv} = \frac{3(u^2+2uv+v^2) \cdot 2uv}{3(u^2-v^2)} = \frac{3(u+v)(u+v) \cdot 2uv}{3(u+v)(u-v)} = \underline{\underline{\frac{2uv(u+v)}{(u-v)}}}$

16. $\frac{3}{2x}\cdot\frac{4}{3y}+\frac{3}{5x}\cdot\frac{5}{2y}=\frac{4}{2xy}+\frac{3}{2xy}=\underline{\underline{\frac{7}{2xy}}}$

17. $\frac{3}{2x}\cdot\left(\frac{4}{3y}+\frac{3}{5x}\right)\cdot\frac{5}{2y}=\frac{3}{2x}\cdot\left(\frac{20x}{15xy}+\frac{9y}{15xy}\right)\cdot\frac{5}{2y}=\frac{3}{2x}\cdot\frac{20x+9y}{15xy}\cdot\frac{5}{2y}=\frac{3\cdot(20x+9y)\cdot 5}{2x\cdot 15xy\cdot 2y}=\underline{\underline{\frac{(20x+9y)}{4x^2y^2}}}$

18. $\left(\frac{n}{m+n}-\frac{m+n}{m-n}\right):\left(\frac{m+n}{m-n}-\frac{n}{m+n}\right)=$

$\left(\frac{n(m-n)}{(m+n)(m-n)}-\frac{(m+n)(m+n)}{(m+n)(m-n)}\right):\left(\frac{(m+n)(m+n)}{(m+n)(m-n)}-\frac{n(m-n)}{(m+n)(m-n)}\right)=$

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

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

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

19. $\frac{2a}{5c}\cdot\frac{3b}{2d}+\frac{5a}{3c}\cdot\frac{2b}{25d}=\frac{3ab}{5cd}+\frac{2ab}{15cd}=\frac{9ab}{15cd}+\frac{2ab}{15cd}=\underline{\underline{\frac{11ab}{15cd}}}$

20. $4a\cdot\frac{x}{15ab}-\frac{ax}{b}:\frac{5a}{3}=\frac{4ax}{15ab}-\frac{3ax}{5ab}=\frac{4ax}{15ab}-\frac{9ax}{15ab}=\frac{-5ax}{15ab}=\underline{\underline{-\frac{x}{3b}}}$

21. $\left(\frac{5r^2}{2t}-\frac{7rt}{12}\right):\frac{r^2t^3}{4}=\left(\frac{30r^2}{12t}-\frac{7rt^2}{12t}\right):\frac{r^2t^3}{4}=\frac{30r^2-7rt^2}{12t}\cdot\frac{4}{r^2t^3}=\frac{r(30r-7t^2)}{12t}\cdot\frac{4}{r^2t^3}=\underline{\underline{\frac{(30r-7t^2)}{3rt^4}}}$

22. $(4m^2-25n^2)\cdot\frac{2m+5n}{8m-20n}=\frac{(2m+5n)(2m-5n)(2m+5n)}{4(2m-5n)}=\underline{\underline{\frac{(2m+5n)(2m+5n)}{4}}}$

23. $\frac{xz-yz}{x+y}:(x^2z-y^2z)=\frac{z(x-y)}{(x+y)\cdot z(x^2-y^2)}=\frac{z(x-y)}{(x+y)\cdot z(x+y)(x-y)}=\underline{\underline{\frac{1}{(x+y)(x+y)}}}$

24. $\frac{xy^2}{x-3y}:\frac{x^2y}{x^2-9y^2}=\frac{xy^2(x+3y)(x-3y)}{(x-3y)\cdot x^2y}=\underline{\underline{\frac{y(x+3y)}{x}}}$

25. $\frac{u+v}{2u-2v}\cdot\frac{3u-3v}{2u-4v}\cdot\frac{4u-8v}{3u+3v}=\frac{(u+v)}{2(u-v)}\cdot\frac{3(u-v)}{2(u-2v)}\cdot\frac{4(u-2v)}{3(u+v)}=\underline{\underline{1}}$

26. $\frac{\frac{15x}{16y}}{\frac{5xy}{2z}}=\frac{15x\cdot 2z}{16y\cdot 5xy}=\underline{\underline{\frac{3z}{8y^2}}}$

27. $\frac{\frac{8a}{bc}}{\frac{10ac}{b}}=\frac{8a\cdot b}{bc\cdot 10ac}=\underline{\underline{\frac{4}{5c^2}}}$

28. $\frac{\frac{x}{y-z}}{\frac{x}{y+z}} = \frac{x \cdot (y+z)}{(y-z) \cdot x} = \underline{\underline{\frac{(y+z)}{(y-z)}}}$

29. $\frac{\frac{1}{a-b}}{\frac{1}{a^2-b^2}} = \frac{1 \cdot (a+b)(a-b)}{(a-b) \cdot 1} = \underline{\underline{a+b}}$

30. $\frac{\frac{p^2}{r^2-s^2}}{\frac{pq}{r-s}} = \frac{p^2 \cdot (r-s)}{(r+s)(r-s) \cdot pq} = \underline{\underline{\frac{p}{q(r+s)}}}$

31. $\frac{\frac{a+b}{a-b}}{\frac{a^2+b^2}{a^2-b^2}} = \frac{(a+b)(a+b)(a-b)}{(a-b) \cdot (a^2+b^2)} = \underline{\underline{\frac{(a+b)(a+b)}{(a^2+b^2)}}}$

32. $\frac{\frac{1}{m}+\frac{1}{n}}{\frac{1}{m}-\frac{1}{n}} = \frac{\frac{n}{mn}+\frac{m}{mn}}{\frac{n}{mn}-\frac{m}{mn}} = \frac{\frac{n+m}{mn}}{\frac{n-m}{mn}} = \frac{(n+m) \cdot mn}{mn(n-m)} = \underline{\underline{\frac{(n+m)}{(n-m)}}}$

33. $\frac{\frac{p}{q}+1}{\frac{p}{q}-1} = \frac{\frac{p}{q}+\frac{q}{q}}{\frac{p}{q}-\frac{q}{q}} = \frac{\frac{p+q}{q}}{\frac{p-q}{q}} = \frac{(p+q) \cdot q}{q(p-q)} = \underline{\underline{\frac{(p+q)}{(p-q)}}}$

34. $\left(\frac{2a+b}{a-2b} - \frac{2a-b}{a+b}\right) : \frac{b}{a-2b} = \left(\frac{(2a+b)(a+b)-(2a-b)(a-2b)}{(a-2b)(a+b)}\right) \cdot \frac{(a-2b)}{b} =$

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

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

$\frac{b(8a-b)}{(a-2b)(a+b)} \cdot \frac{(a-2b)}{b} = \underline{\underline{\frac{(8a-b)}{(a+b)}}}$