Bruchrechnen: Bruchterme mit Variablen

Vereinfache Bruchterme mit Variablen durch Erweitern, Kürzen und Zusammenfassen. Gib bei jedem Term zusätzlich alle Werte an, die für die Variable nicht erlaubt sind.
Für Feedback und Anregungen bitte E-Mail an uebungsblaetter.ch@gmail.com.

Bruchterme mit Variablen

1) $\frac{3x}{4} + \frac{5x}{6}$

2) $\frac{2a}{3} - \frac{a-1}{4}$

3) $\frac{x}{x+2} + \frac{3}{x+2}$

4) $\frac{2}{x} + \frac{5}{3x}$

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

6) $\frac{4x}{x-2} \cdot \frac{x-2}{6}$

7) $\frac{3x}{x+1} : \frac{9x}{2x+2}$

8) $\frac{1}{x-1} - \frac{1}{x+1}$

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

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

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

12) $\left(\frac{x}{3} + \frac{2}{5}\right) \cdot \frac{15}{x+1}$

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

14) $\frac{2}{x} - \frac{3}{x+1} + \frac{1}{x(x+1)}$

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

16) $\left(\frac{3a}{a-2} + \frac{6}{2-a}\right) \cdot \frac{a-2}{a}$

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

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

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

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

Lösungen

Bruchterme mit Variablen

21) $\frac{3x}{4} + \frac{5x}{6} = \frac{9x}{12} + \frac{10x}{12} = \boxed{\frac{19x}{12}}$

22) $\frac{2a}{3} - \frac{a-1}{4} = \frac{8a}{12} - \frac{3a-3}{12} = \boxed{\frac{5a+3}{12}}$

23) $\frac{x}{x+2} + \frac{3}{x+2} = \boxed{\frac{x+3}{x+2}}, \qquad x \neq -2$

24) $\frac{2}{x} + \frac{5}{3x} = \frac{6}{3x} + \frac{5}{3x} = \boxed{\frac{11}{3x}}, \qquad x \neq 0$

25) $\frac{x^2-9}{x+3} = \frac{(x-3)(x+3)}{x+3} = \boxed{x-3}, \qquad x \neq -3$

26) $\frac{4x}{x-2} \cdot \frac{x-2}{6} = \boxed{\frac{2x}{3}}, \qquad x \neq 2$

27) $\frac{3x}{x+1} : \frac{9x}{2x+2} = \frac{3x}{x+1} \cdot \frac{2(x+1)}{9x} = \boxed{\frac{2}{3}}, \qquad x \neq -1,\ x \neq 0$

28) $\frac{1}{x-1} - \frac{1}{x+1} = \frac{x+1-(x-1)}{(x-1)(x+1)} = \boxed{\frac{2}{x^2-1}}, \qquad x \neq -1,\ x \neq 1$

29) $\left(\frac{2}{x} + \frac{1}{3}\right) : \frac{4}{x} = \frac{x+6}{3x} \cdot \frac{x}{4} = \boxed{\frac{x+6}{12}}, \qquad x \neq 0$

30) $\left(\frac{x}{x-2} - 1\right) \cdot \frac{x-2}{2} = \frac{2}{x-2} \cdot \frac{x-2}{2} = \boxed{1}, \qquad x \neq 2$

31) $\frac{3x}{4} - \frac{2x-1}{6} + \frac{x+2}{3} = \frac{9x-(4x-2)+(4x+8)}{12} = \boxed{\frac{9x+10}{12}}$

32) $\left(\frac{x}{3} + \frac{2}{5}\right) \cdot \frac{15}{x+1} = \frac{5x+6}{15} \cdot \frac{15}{x+1} = \boxed{\frac{5x+6}{x+1}}, \qquad x \neq -1$

33) $\frac{x^2-4}{x-2} - \frac{x^2-1}{x+1} = (x+2) - (x-1) = \boxed{3}, \qquad x \neq 2,\ x \neq -1$

34) $\dfrac{2}{x}-\dfrac{3}{x+1}+\dfrac{1}{x(x+1)}=\dfrac{2(x+1)-3x+1}{x(x+1)}=\boxed{\dfrac{3-x}{x(x+1)}}, \qquad x\neq 0,\ x\neq -1$

35) $\dfrac{x-1}{x+2}:\dfrac{x^2-1}{x^2+4x+4}=\dfrac{x-1}{x+2}\cdot\dfrac{(x+2)^2}{(x-1)(x+1)}=\boxed{\dfrac{x+2}{x+1}}, \qquad x\neq -2,\ x\neq -1,\ x\neq 1$

36) $\left(\dfrac{3a}{a-2}+\dfrac{6}{2-a}\right)\cdot\dfrac{a-2}{a}=\dfrac{3a-6}{a-2}\cdot\dfrac{a-2}{a}=\boxed{\dfrac{3(a-2)}{a}}, \qquad a\neq 0,\ a\neq 2$

37) $\left(\dfrac{1}{x}+\dfrac{1}{x-2}\right):\dfrac{2(x-1)}{x(x-2)}=\dfrac{2(x-1)}{x(x-2)}:\dfrac{2(x-1)}{x(x-2)}=\boxed{1}, \qquad x\neq 0,\ x\neq 1,\ x\neq 2$

38) $\left(\dfrac{x}{x-3}-\dfrac{3}{x-3}\right)^2\cdot\dfrac{x-3}{x+2}=1^2\cdot\dfrac{x-3}{x+2}=\boxed{\dfrac{x-3}{x+2}}, \qquad x\neq 3,\ x\neq -2$

39) $\left(\dfrac{2}{x}-\dfrac{1}{y}\right):\dfrac{2y-x}{xy}=\dfrac{2y-x}{xy}:\dfrac{2y-x}{xy}=\boxed{1}, \qquad x\neq 0,\ y\neq 0,\ 2y\neq x$

40) $\left(\dfrac{x}{x+1}+\dfrac{1}{x-1}\right)\cdot\dfrac{x^2-1}{x^2+x+1}=\dfrac{x^2+1}{x^2-1}\cdot\dfrac{x^2-1}{x^2+x+1}=\boxed{\dfrac{x^2+1}{x^2+x+1}}, \qquad x\neq -1,\ x\neq 1$