

## Das Distributivgesetz

Beispiel:

$$\left(2\frac{1}{2} \cdot \frac{3}{4} + 1\frac{1}{2} \cdot \frac{7}{10}\right) \cdot 5 = \left(\frac{5}{2} \cdot \frac{3}{4} + \frac{3}{2} \cdot \frac{7}{10}\right) \cdot 5 = \left(\frac{15}{8} + \frac{21}{10}\right) \cdot 5$$

1. Möglichkeit:  $\left(\frac{75}{40} + \frac{42}{40}\right) \cdot 5 = \frac{117}{40} \cdot 5 = \frac{117}{8} = 14\frac{5}{8}$

2. Möglichkeit:  $\frac{15}{8} \cdot 5 + \frac{21}{10} \cdot 5 = \frac{75}{8} + \frac{21}{2} = \frac{75}{8} + \frac{42}{8} = \frac{117}{8} = 14\frac{5}{8}$

Für beliebige rationale Zahlen a, b, c gilt:  
 $a \cdot (b + c) = a \cdot b + a \cdot c$  (Distributivgesetz)

Aufgaben:

1  $a(x-y)+a(x+y)$

2  $(-5)(2a+3b)$

3  $(-17) \cdot 16 + (-17) \cdot 4$

4  $2a(a-3b)$

5  $-a \cdot (-b-c)$

6  $2u(9u-4v+1)$

7  $4(2a+3b)+(3a+2b) \cdot 5$

8  $a(x-y)-a(-x-y)$

9  $5(6a-4b)+6(2b-a)-3(5a-9b)$

10  $-(p-q) \cdot p - (-p+q) \cdot q$

11  $\frac{1}{2}(p+q-r) - \frac{1}{3}(p-q+r) + \frac{1}{6}(-p+q+r)$

### Lösungen:

- 1  $a(x-y) + a(x+y) = ax - ay + ax + ay = 2ax$
- 2  $(-5)(2a+3b) = -10a - 15b$
- 3  $(-17) \cdot 16 + (-17) \cdot 4 = (-17)(16+4) = (-17) \cdot 20 = -340$
- 4  $2a(a-3b) = 2a^2 - 6ab$
- 5  $-a \cdot (-b-c) = ab + ac$
- 6  $2u(9u-4v+1) = 18u^2 - 8uv + 2u$
- 7  $4(2a+3b) + (3a+2b) \cdot 5 = 8a + 12b + 15a + 10b = 23a + 22b$
- 8  $a(x-y) - a(-x-y) = ax - ay + ax + ay = 2ax$
- 9  $5(6a-4b) + 6(2b-a) - 3(5a-9b) =$   
 $30a - 20b + 12b - 6a - 15a + 27b = 9a + 19b$
- 10  $-(p-q) \cdot p - (-p+q) \cdot q = -p^2 + pq + pq - q^2 = -p^2 + 2pq - q^2$
- 11  $\frac{1}{2}(p+q-r) - \frac{1}{3}(p-q+r) + \frac{1}{6}(-p+q+r) =$   
 $\frac{1}{2}p + \frac{1}{2}q - \frac{1}{2}r - \frac{1}{3}p + \frac{1}{3}q - \frac{1}{3}r - \frac{1}{6}p + \frac{1}{6}q + \frac{1}{6}r =$   
 $\frac{3}{6}p + \frac{3}{6}q - \frac{3}{6}r - \frac{2}{6}p + \frac{2}{6}q - \frac{2}{6}r - \frac{1}{6}p + \frac{1}{6}q + \frac{1}{6}r = q - \frac{2}{3}r$