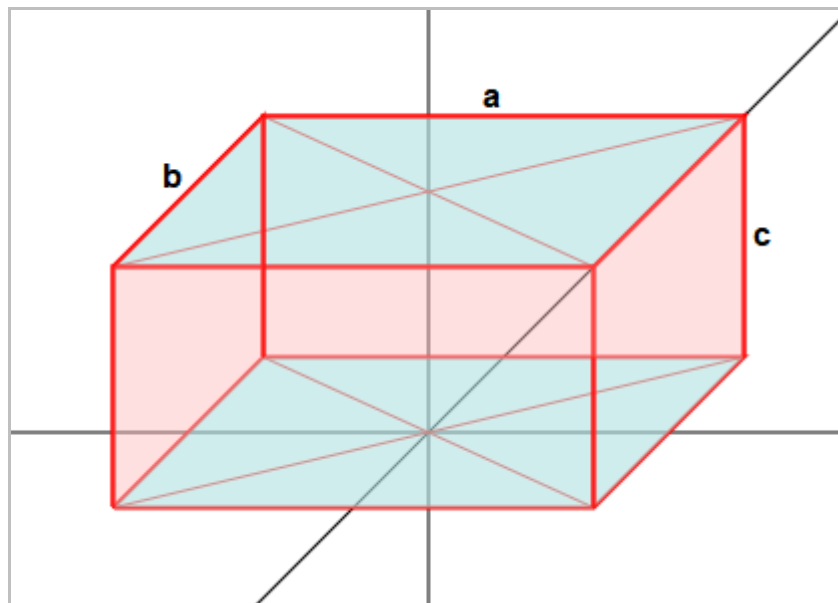


Mathematik-Aufgabenpool

> Quaderberechnung I

Einleitung: Ein Quader ist durch die Größe der Quaderkanten a, b, c bestimmt. Es gilt für die Quadergrundfläche G, die Oberfläche O und das Volumen: $G=ab$, $O=2(ab+ac+bc)$, $V=abc$.



Quader: Quaderkanten a, b, c

Formelsammlung:

Grund-/Deckfläche	$G = ab$	$a = \frac{G}{b}$	$b = \frac{G}{a}$
Quaderumfang	$u = 2a+2b$	$a = \frac{u}{2} - b$	$b = \frac{u}{2} - a$
Mantelfläche	$M = uc$	$u = \frac{M}{c}$	$c = \frac{M}{u}$
Oberfläche	$O = 2G + M$	$M = O - 2G$	$G = \frac{O - M}{2}$
	$O = 2(ab + ac + bc)$		
	$a = \frac{O - 2bc}{2(b + c)}$	$b = \frac{O - 2ac}{2(a + c)}$	$c = \frac{O - 2ab}{2(a + b)}$
Volumen	$V = G \cdot c = abc$	$G = \frac{V}{c}$	
	$a = \frac{V}{bc}$	$b = \frac{V}{ac}$	$c = \frac{V}{ab}$

Aufgabe 1: Berechne die jeweils fehlenden Größen des Quaders (Kanten a, b, c; Oberfläche $O=2(ab+ac+bc)$, Volumen $V=abc$).

Nr.	Gegeben:	Gesucht:
1	a = 5.3 cm, b = 6.1 cm, c = 2.1 cm	O, V
2	a = 6.9 cm, b = 1.1 cm, c = 7.1 cm	O, V
3	a = 2.8 cm, b = 7.8 cm, c = 5.7 cm	O, V
4	a = 1.2 cm, b = 7.9 cm, c = 3.9 cm	O, V
5	a = 6.3 cm, b = 6.2 cm, c = 7.3 cm	O, V
6	a = 7.2 cm, b = 1.7 cm, c = 1.5 cm	O, V
7	a = 3.1 cm, b = 6.5 cm, c = 1.1 cm	O, V
8	a = 5.8 cm, b = 3.3 cm, c = 7.2 cm	O, V
9	a = 3.3 cm, b = 9.1 cm, c = 7.1 cm	O, V
10	a = 8.1 cm, b = 8.8 cm, c = 8.0 cm	O, V
11	a = 6.8 cm, b = 2.2 cm, c = 3.2 cm	O, V
12	a = 2.4 cm, b = 2.6 cm, c = 7.6 cm	O, V
13	a = 8.1 cm, b = 4.5 cm, c = 6.7 cm	O, V
14	a = 7.4 cm, b = 7.3 cm, c = 8.8 cm	O, V
15	a = 5.5 cm, b = 4.8 cm, c = 6.9 cm	O, V
16	a = 3.6 cm, b = 9.2 cm, c = 3.5 cm	O, V
17	a = 3.7 cm, b = 9.6 cm, c = 7.0 cm	O, V
18	a = 7.9 cm, b = 1.4 cm, c = 4.0 cm	O, V
19	a = 7.6 cm, b = 3.6 cm, c = 1.5 cm	O, V
20	a = 4.4 cm, b = 5.1 cm, c = 8.7 cm	O, V

Vorgehensweise: Zur Ermittlung der fehlenden Größen beim Quader ist die obige Formelsammlung anzuwenden.

Lösungen:

Nr.	Kante a=	Kante b=	Kante c=	Oberfläche O=	Volumen V=
1	5.3 cm	6.1 cm	2.1 cm	112.5 cm ²	67.9 cm ³
2	6.9 cm	1.1 cm	7.1 cm	128.8 cm ²	53.9 cm ³
3	2.8 cm	7.8 cm	5.7 cm	164.5 cm ²	124.5 cm ³
4	1.2 cm	7.9 cm	3.9 cm	89.9 cm ²	37.0 cm ³
5	6.3 cm	6.2 cm	7.3 cm	260.6 cm ²	285.1 cm ³
6	7.2 cm	1.7 cm	1.5 cm	51.2 cm ²	18.4 cm ³
7	3.1 cm	6.5 cm	1.1 cm	61.4 cm ²	22.2 cm ³
8	5.8 cm	3.3 cm	7.2 cm	169.3 cm ²	137.8 cm ³
9	3.3 cm	9.1 cm	7.1 cm	236.1 cm ²	213.2 cm ³
10	8.1 cm	8.8 cm	8.0 cm	413.0 cm ²	570.2 cm ³
11	6.8 cm	2.2 cm	3.2 cm	87.5 cm ²	47.9 cm ³
12	2.4 cm	2.6 cm	7.6 cm	88.5 cm ²	47.4 cm ³
13	8.1 cm	4.5 cm	6.7 cm	241.7 cm ²	244.2 cm ³
14	7.4 cm	7.3 cm	8.8 cm	366.8 cm ²	475.4 cm ³
15	5.5 cm	4.8 cm	6.9 cm	194.9 cm ²	182.2 cm ³
16	3.6 cm	9.2 cm	3.5 cm	155.8 cm ²	115.9 cm ³
17	3.7 cm	9.6 cm	7.0 cm	257.2 cm ²	248.6 cm ³
18	7.9 cm	1.4 cm	4.0 cm	96.5 cm ²	44.2 cm ³
19	7.6 cm	3.6 cm	1.5 cm	88.3 cm ²	41.0 cm ³
20	4.4 cm	5.1 cm	8.7 cm	210.2 cm ²	195.2 cm ³

Aufgabe 2: Berechne die jeweils fehlenden Größen des Quaders (Kanten a, b, c; Oberfläche $O=2(ab+ac+bc)$, Volumen $V=abc$).

Nr.	Gegeben:	Gesucht:
1	a = 12.3 mm, b = 16.6 mm, c = 5.8 mm	O, V
2	a = 24.2 cm, b = 12.7 cm, c = 16.7 cm	O, V
3	a = 16.6 m, b = 12.0 m, c = 5.1 m	O, V
4	a = 6.7 cm, b = 16.6 cm, c = 14.7 cm	O, V
5	a = 19.0 mm, b = 18.6 mm, c = 5.8 mm	O, V
6	a = 21.2 m, b = 11.9 m, c = 16.4 m	O, V
7	a = 11.5 dm, b = 11.3 dm, c = 12.2 dm	O, V
8	a = 22.2 mm, b = 13.7 mm, c = 9.3 mm	O, V
9	a = 11.2 dm, b = 16.0 dm, c = 10.0 dm	O, V
10	a = 10.5 mm, b = 12.6 mm, c = 13.9 mm	O, V
11	a = 14.2 mm, b = 13.5 mm, c = 7.0 mm	O, V
12	a = 15.8 m, b = 14.4 m, c = 18.2 m	O, V
13	a = 19.8 mm, b = 11.7 mm, c = 17.7 mm	O, V
14	a = 14.8 m, b = 18.0 m, c = 9.1 m	O, V
15	a = 5.0 cm, b = 18.8 cm, c = 19.0 cm	O, V
16	a = 16.2 dm, b = 17.9 dm, c = 16.5 dm	O, V
17	a = 26.7 m, b = 13.1 m, c = 14.0 m	O, V
18	a = 14.0 mm, b = 12.9 mm, c = 19.0 mm	O, V
19	a = 5.6 m, b = 14.2 m, c = 10.2 m	O, V
20	a = 14.9 dm, b = 11.9 dm, c = 18.8 dm	O, V

Vorgehensweise: Zur Ermittlung der fehlenden Größen beim Quader ist die obige Formelsammlung anzuwenden.

Lösungen:

Nr.	Kante a=	Kante b=	Kante c=	Oberfläche O=	Volumen V=
1	12.3 mm	16.6 mm	5.8 mm	743.6 mm ²	1184.2 mm ³
2	24.2 cm	12.7 cm	16.7 cm	1847.1 cm ²	5132.6 cm ³
3	16.6 m	12.0 m	5.1 m	690.1 m ²	1015.9 m ³
4	6.7 cm	16.6 cm	14.7 cm	907.5 cm ²	1634.9 cm ³
5	19.0 mm	18.6 mm	5.8 mm	1143.0 mm ²	2049.7 mm ³
6	21.2 m	11.9 m	16.4 m	1590.2 m ²	4137.4 m ³
7	11.5 dm	11.3 dm	12.2 dm	816.2 dm ²	1585.4 dm ³
8	22.2 mm	13.7 mm	9.3 mm	1276.0 mm ²	2828.5 mm ³
9	11.2 dm	16.0 dm	10.0 dm	902.4 dm ²	1792.0 dm ³
10	10.5 mm	12.6 mm	13.9 mm	906.8 mm ²	1839.0 mm ³
11	14.2 mm	13.5 mm	7.0 mm	771.2 mm ²	1341.9 mm ³
12	15.8 m	14.4 m	18.2 m	1554.3 m ²	4140.9 m ³
13	19.8 mm	11.7 mm	17.7 mm	1578.4 mm ²	4100.4 mm ³
14	14.8 m	18.0 m	9.1 m	1129.8 m ²	2424.2 m ³
15	5.0 cm	18.8 cm	19.0 cm	1092.4 cm ²	1786.0 cm ³
16	16.2 dm	17.9 dm	16.5 dm	1705.3 dm ²	4784.7 dm ³
17	26.7 m	13.1 m	14.0 m	1813.9 m ²	4896.8 m ³
18	14.0 mm	12.9 mm	19.0 mm	1383.4 mm ²	3431.4 mm ³
19	5.6 m	14.2 m	10.2 m	563.0 m ²	811.1 m ³
20	14.9 dm	11.9 dm	18.8 dm	1362.3 dm ²	3333.4 dm ³

Aufgabe 3: Berechne die jeweils fehlenden Größen des Quaders (Kanten a, b, c; Oberfläche $O=2(ab+ac+bc)$, Volumen $V=abc$).

Nr.	Gegeben:	Gesucht:
1	a = 12.4 cm, b = 14.4 cm, V = 2214.1 cm ³	c, O
2	b = 13.9 cm, c = 5.7 cm, V = 1552.9 cm ³	a, O
3	a = 8.0 cm, b = 5.9 cm, O = 486.4 cm ²	c, V
4	b = 9.8 cm, c = 4.8 cm, O = 389.0 cm ²	a, V
5	b = 6.1 cm, c = 14.7 cm, V = 1058.1 cm ³	a, O
6	b = 14.8 cm, c = 4.3 cm, V = 1132.8 cm ³	a, O
7	a = 5.4 cm, b = 12.7 cm, c = 4.8 cm	O, V
8	b = 13.2 cm, c = 8.8 cm, O = 628.3 cm ²	a, V
9	a = 11.2 cm, b = 9.0 cm, c = 12.6 cm	O, V
10	a = 11.4 cm, c = 8.9 cm, O = 880.9 cm ²	b, V
11	a = 6.8 cm, b = 8.1 cm, V = 627.9 cm ³	c, O
12	b = 9.7 cm, c = 4.5 cm, V = 375.4 cm ³	a, O
13	a = 19.1 cm, b = 15.8 cm, c = 8.1 cm	O, V
14	a = 11.7 cm, b = 9.5 cm, V = 1367.1 cm ³	c, O
15	a = 19.9 cm, c = 13.0 cm, V = 1940.3 cm ³	b, O
16	a = 18.6 cm, b = 15.0 cm, c = 4.8 cm	O, V
17	a = 16.7 cm, b = 18.7 cm, O = 1049.4 cm ²	c, V
18	a = 6.6 cm, c = 12.1 cm, V = 758.7 cm ³	b, O
19	a = 15.9 cm, b = 9.2 cm, O = 694.2 cm ²	c, V
20	a = 8.7 cm, b = 14.4 cm, V = 563.8 cm ³	c, O

Vorgehensweise: Zur Ermittlung der fehlenden Größen beim Quader ist die obige Formelsammlung anzuwenden.

Lösungen:

Nr.	Kante a=	Kante b=	Kante c=	Oberfläche O=	Volumen V=
1	12.4 cm	14.4 cm	12.4 cm	1021.8 cm ²	2214.1 cm ³
2	19.6 cm	13.9 cm	5.7 cm	926.8 cm ²	1552.9 cm ³
3	8.0 cm	5.9 cm	14.1 cm	486.4 cm ²	665.5 cm ³
4	10.1 cm	9.8 cm	4.8 cm	389.0 cm ²	475.1 cm ³
5	11.8 cm	6.1 cm	14.7 cm	670.2 cm ²	1058.1 cm ³
6	17.8 cm	14.8 cm	4.3 cm	807.2 cm ²	1132.8 cm ³
7	5.4 cm	12.7 cm	4.8 cm	310.9 cm ²	329.2 cm ³
8	9.0 cm	13.2 cm	8.8 cm	628.3 cm ²	1045.4 cm ³
9	11.2 cm	9.0 cm	12.6 cm	710.6 cm ²	1270.1 cm ³
10	11.4 cm	16.7 cm	8.9 cm	880.9 cm ²	1694.4 cm ³
11	6.8 cm	8.1 cm	11.4 cm	449.9 cm ²	627.9 cm ³
12	8.6 cm	9.7 cm	4.5 cm	331.5 cm ²	375.4 cm ³
13	19.1 cm	15.8 cm	8.1 cm	1168.9 cm ²	2444.4 cm ³
14	11.7 cm	9.5 cm	12.3 cm	743.8 cm ²	1367.1 cm ³
15	19.9 cm	7.5 cm	13.0 cm	1010.9 cm ²	1940.3 cm ³
16	18.6 cm	15.0 cm	4.8 cm	880.6 cm ²	1339.2 cm ³
17	16.7 cm	18.7 cm	6.0 cm	1049.4 cm ²	1873.7 cm ³
18	6.6 cm	9.5 cm	12.1 cm	515.0 cm ²	758.7 cm ³
19	15.9 cm	9.2 cm	8.0 cm	694.2 cm ²	1170.2 cm ³
20	8.7 cm	14.4 cm	4.5 cm	458.5 cm ²	563.8 cm ³

Aufgabe 4: Berechne die jeweils fehlenden Größen des Quaders (Kanten a, b, c; Oberfläche $O=2(ab+ac+bc)$, Volumen $V=abc$).

Nr.	Gegeben:	Gesucht:
1	a = 15.3 m, c = 7.2 m, V = 2137.1 m ³	b, O
2	a = 24.1 cm, b = 15.5 cm, V = 7246.9 cm ³	c, O
3	a = 15.2 dm, b = 16.6 dm, c = 6.8 dm	O, V
4	a = 16.7 cm, b = 8.2 cm, c = 7.7 cm	O, V
5	a = 6.0 cm, b = 9.0 cm, O = 564.0 cm ²	c, V
6	b = 20.3 dm, c = 7.0 dm, O = 753.8 dm ²	a, V
7	a = 11.0 cm, b = 5.4 cm, c = 13.8 cm	O, V
8	b = 7.3 dm, c = 19.5 dm, V = 3245.6 dm ³	a, O
9	a = 6.9 dm, b = 20.9 dm, V = 2076.6 dm ³	c, O
10	a = 11.7 mm, b = 5.0 mm, O = 437.6 mm ²	c, V
11	b = 12.7 m, c = 15.3 m, V = 3011.8 m ³	a, O
12	a = 19.7 dm, b = 15.8 dm, V = 4077.5 dm ³	c, O
13	a = 24.7 cm, b = 19.3 cm, O = 2616.6 cm ²	c, V
14	a = 18.4 m, b = 19.9 m, O = 2157.1 m ²	c, V
15	a = 21.9 dm, b = 9.3 dm, V = 1588.6 dm ³	c, O
16	a = 22.2 cm, b = 11.4 cm, c = 6.3 cm	O, V
17	a = 16.1 dm, b = 19.8 dm, V = 6343.7 dm ³	c, O
18	a = 6.2 m, c = 12.1 m, V = 1597.9 m ³	b, O
19	a = 16.7 m, c = 14.1 m, V = 5180.3 m ³	b, O
20	a = 15.7 m, c = 14.3 m, O = 1541.0 m ²	b, V

Vorgehensweise: Zur Ermittlung der fehlenden Größen beim Quader ist die obige Formelsammlung anzuwenden.

Lösungen:

Nr.	Kante a=	Kante b=	Kante c=	Oberfläche O=	Volumen V=
1	15.3 m	19.4 m	7.2 m	1093.3 m ²	2137.1 m ³
2	24.1 cm	15.5 cm	19.4 cm	2283.6 cm ²	7246.9 cm ³
3	15.2 dm	16.6 dm	6.8 dm	937.1 dm ²	1715.8 dm ³
4	16.7 cm	8.2 cm	7.7 cm	657.3 cm ²	1054.4 cm ³
5	6.0 cm	9.0 cm	15.2 cm	564.0 cm ²	820.8 cm ³
6	8.6 dm	20.3 dm	7.0 dm	753.8 dm ²	1222.1 dm ³
7	11.0 cm	5.4 cm	13.8 cm	571.4 cm ²	819.7 cm ³
8	22.8 dm	7.3 dm	19.5 dm	1506.8 dm ²	3245.6 dm ³
9	6.9 dm	20.9 dm	14.4 dm	1089.1 dm ²	2076.6 dm ³
10	11.7 mm	5.0 mm	9.6 mm	437.6 mm ²	561.6 mm ³
11	15.5 m	12.7 m	15.3 m	1256.6 m ²	3011.8 m ³
12	19.7 dm	15.8 dm	13.1 dm	1552.6 dm ²	4077.5 dm ³
13	24.7 cm	19.3 cm	18.9 cm	2616.6 cm ²	9009.8 cm ³
14	18.4 m	19.9 m	18.6 m	2157.1 m ²	6810.6 m ³
15	21.9 dm	9.3 dm	7.8 dm	894.1 dm ²	1588.6 dm ³
16	22.2 cm	11.4 cm	6.3 cm	929.5 cm ²	1594.4 cm ³
17	16.1 dm	19.8 dm	19.9 dm	2066.4 dm ²	6343.7 dm ³
18	6.2 m	21.3 m	12.1 m	929.6 m ²	1597.9 m ³
19	16.7 m	22.0 m	14.1 m	1826.1 m ²	5180.3 m ³
20	15.7 m	18.2 m	14.3 m	1541.0 m ²	4086.1 m ³