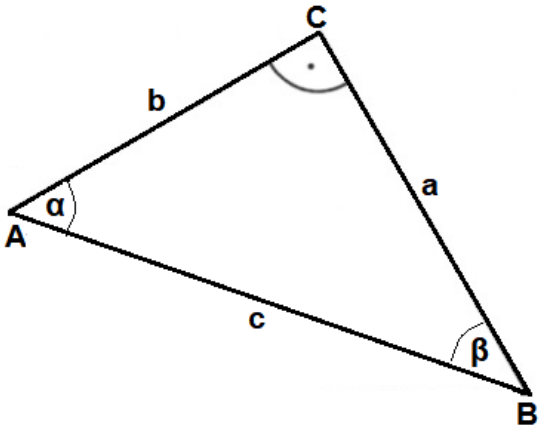
Michael Buhlmann

Mathematik-Aufgabenpool
> Satz des Pythagoras I

Einleitung: In einem rechtwinkligen Dreieck ΔABC mit den Seiten a, b, c und den Winkeln α, β, γ bei γ = 90° heißen a und b Katheten, c Hypotenuse.

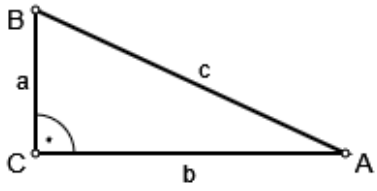


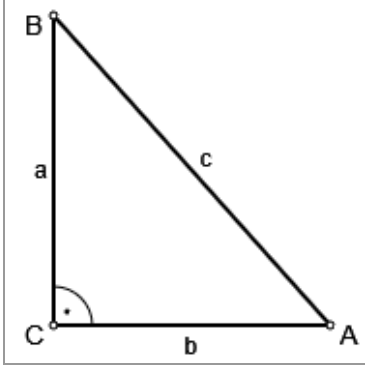
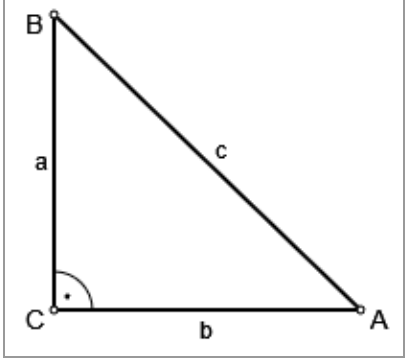
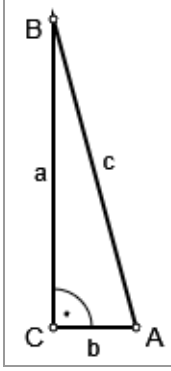
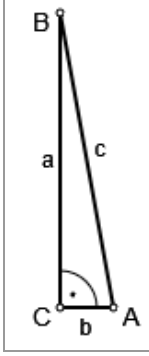
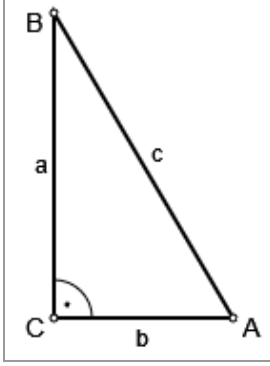
Rechtwinkliges Dreieck: Seiten a, b, c; Winkel α, β, γ=90°

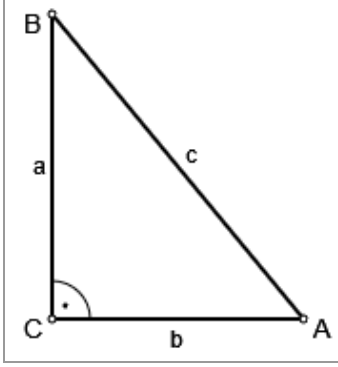
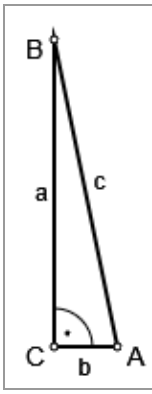
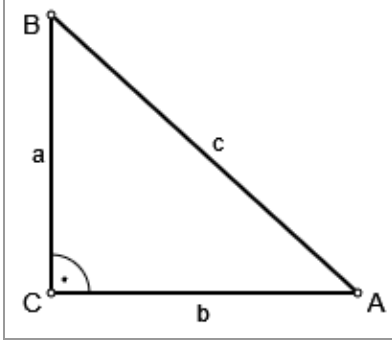
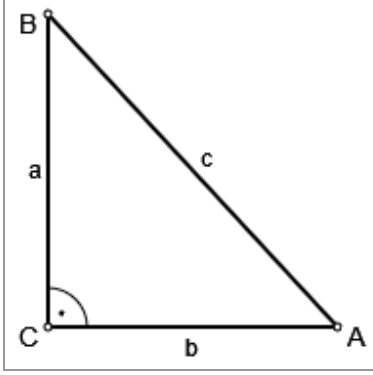
Formelsammlung:

Satz des Pythagoras	$c^2 = a^2 + b^2 \Rightarrow c = \sqrt{a^2 + b^2}$ (Hypotenuse) $a^2 = c^2 - b^2 \Rightarrow a = \sqrt{c^2 - b^2}$ (Kathete) $b^2 = c^2 - a^2 \Rightarrow b = \sqrt{c^2 - a^2}$ (Kathete)
Umfang	u = a + b + c
Fläche	$A = \frac{1}{2}ab$

Aufgabe 1: Berechne die fehlende Seitenlänge im rechtwinkligen Dreieck ΔABC (Winkel γ = 90°, a, b = Katheten, c = Hypotenuse).

Nr.	*Gegeben:*	*Grafik:*
1	a = 1.2 cm, c = 2.9 cm	

2	a = 9.4 cm, c = 12.6 cm	
3	b = 2.5 cm, c = 3.5 cm	
4	a = 7.8 cm, c = 8.1 cm	
5	a = 6 cm, b = 1.1 cm	
6	a = 5.8 cm, c = 6.7 cm	

7	b = 5.1 cm, c = 8 cm	
8	a = 9.8 cm, b = 2 cm	
9	a = 8.5 cm, b = 9.4 cm	
10	a = 5.2 cm, c = 7.1 cm	

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

Lösungen:

Nr.	*Gegeben:*	*Lösungen:*
1	a = 1.2 cm, c = 2.9 cm	a = 1.2 cm, b = 2.6 cm, c = 2.9 cm
2	a = 9.4 cm, c = 12.6 cm	a = 9.4 cm, b = 8.4 cm, c = 12.6 cm
3	b = 2.5 cm, c = 3.5 cm	a = 2.4 cm, b = 2.5 cm, c = 3.5 cm
4	a = 7.8 cm, c = 8.1 cm	a = 7.8 cm, b = 2.1 cm, c = 8.1 cm
5	a = 6 cm, b = 1.1 cm	a = 6 cm, b = 1.1 cm, c = 6.1 cm
6	a = 5.8 cm, c = 6.7 cm	a = 5.8 cm, b = 3.4 cm, c = 6.7 cm

7	b = 5.1 cm, c = 8 cm	a = 6.2 cm, b = 5.1 cm, c = 8 cm
8	a = 9.8 cm, b = 2 cm	a = 9.8 cm, b = 2 cm, c = 10 cm
9	a = 8.5 cm, b = 9.4 cm	a = 8.5 cm, b = 9.4 cm, c = 12.7 cm
10	a = 5.2 cm, c = 7.1 cm	a = 5.2 cm, b = 4.8 cm, c = 7.1 cm

Aufgabe 2: Berechne die fehlende Seitenlänge im rechtwinkligen Dreieck ΔABC (Winkel γ = 90°, a, b = Katheten, c = Hypotenuse).

Nr.	*Seiten:*
1	a = 2.7 dm, c = 4.5 dm
2	a = 0.4 dm, b = 0.09 dm
3	a = 33 cm, b = 44 cm
4	b = 0.2 dm, c = 1.01 dm
5	a = 0.44 m, b = 0.33 m
6	a = 0.15 dm, c = 0.17 dm
7	a = 0.8 mm, b = 0.6 mm
8	a = 6.5 m, b = 7.2 m
9	a = 5.1 mm, b = 6.8 mm
10	a = 4.4 m, b = 3.3 m
11	a = 3.9 dm, c = 6.5 dm
12	a = 0.6 mm, c = 1 mm
13	a = 69 dm, c = 115 dm
14	b = 20 dm, c = 101 dm
15	a = 0.35 cm, b = 0.12 cm
16	a = 11 dm, c = 61 dm
17	a = 0.96 dm, b = 0.28 dm
18	a = 10 dm, c = 26 dm
19	a = 45 mm, c = 51 mm
20	a = 77 mm, c = 85 mm

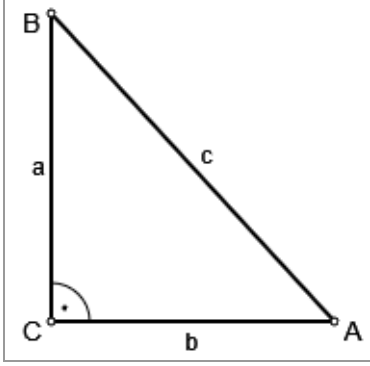
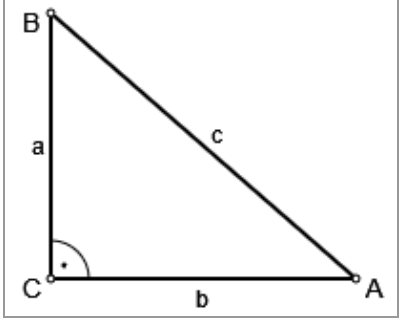
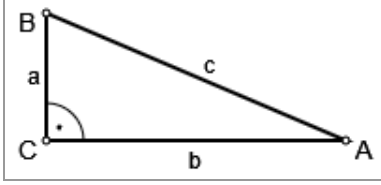
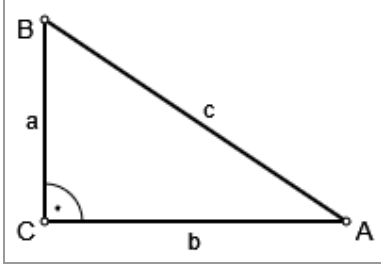
Vorgehensweise: Zur Ermittlung der fehlenden Größen beim rechtwinkligen Dreieck ist die obige Formelsammlung anzuwenden.

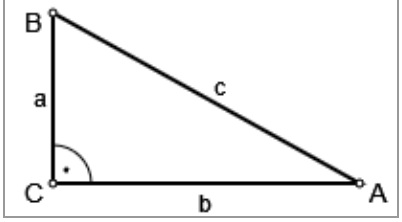
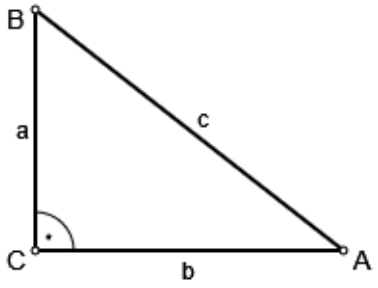
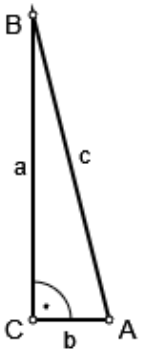
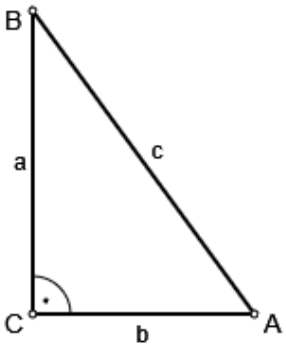
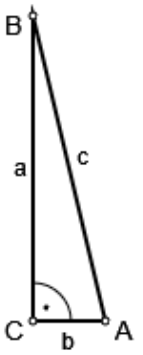
Lösungen:

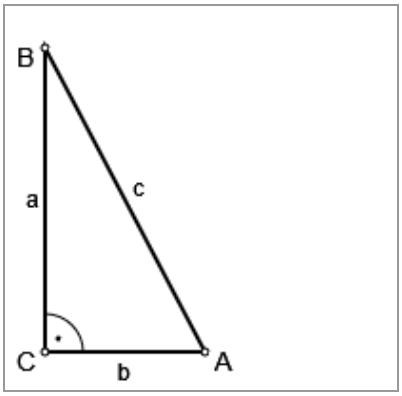
Nr.	*Seiten:*	*Lösung*
1	a = 2.7 dm, c = 4.5 dm	b = 3.6 dm
2	a = 0.4 dm, b = 0.09 dm	c = 0.41 dm
3	a = 33 cm, b = 44 cm	c = 55 cm
4	b = 0.2 dm, c = 1.01 dm	a = 0.99 dm
5	a = 0.44 m, b = 0.33 m	c = 0.55 m
6	a = 0.15 dm, c = 0.17 dm	b = 0.08 dm
7	a = 0.8 mm, b = 0.6 mm	c = 1 mm
8	a = 6.5 m, b = 7.2 m	c = 9.7 m
9	a = 5.1 mm, b = 6.8 mm	c = 8.5 mm
10	a = 4.4 m, b = 3.3 m	c = 5.5 m
11	a = 3.9 dm, c = 6.5 dm	b = 5.2 dm
12	a = 0.6 mm, c = 1 mm	b = 0.8 mm
13	a = 69 dm, c = 115 dm	b = 92 dm
14	b = 20 dm, c = 101 dm	a = 99 dm
15	a = 0.35 cm, b = 0.12 cm	c = 0.37 cm

16	a = 11 dm, c = 61 dm	b = 60 dm
17	a = 0.96 dm, b = 0.28 dm	c = 1 dm
18	a = 10 dm, c = 26 dm	b = 24 dm
19	a = 45 mm, c = 51 mm	b = 24 mm
20	a = 77 mm, c = 85 mm	b = 36 mm

Aufgabe 3: Berechne die fehlenden Größen im rechtwinkligen Dreieck ΔABC (Winkel γ = 90°, a, b = Katheten, c = Hypotenuse, A = Flächeninhalt, u = Umfang).

Nr.	*Gegeben:*	*Grafik:*
1	a = 5 mm, c = 6.8 mm	
2	a = 7.8 mm, c = 11.9 mm	
3	a = 1.9 cm, c = 4.9 cm	
4	b = 9.4 cm, c = 11.3 cm	

5	b = 9.3 dm, c = 10.7 dm	
6	a = 4 dm, b = 5.1 dm	
7	a = 8.1 cm, b = 2 cm	
8	b = 7 cm, c = 11.9 cm	
9	a = 8.1 dm, c = 8.3 dm	

10	a = 4 mm, c = 4.5 mm	

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

Lösungen:

Nr.	*Gegeben:*	*Lösungen:*
1	a = 5 mm, c = 6.8 mm	a = 5 mm, b = 4.6 mm, c = 6.8 mm, u = 16.4 mm, A = 11.5 mm^2
2	a = 7.8 mm, c = 11.9 mm	a = 7.8 mm, b = 9 mm, c = 11.9 mm, u = 28.7 mm, A = 35.1 mm^2
3	a = 1.9 cm, c = 4.9 cm	a = 1.9 cm, b = 4.5 cm, c = 4.9 cm, u = 11.3 cm, A = 4.3 cm^2
4	b = 9.4 cm, c = 11.3 cm	a = 6.3 cm, b = 9.4 cm, c = 11.3 cm, u = 27 cm, A = 29.6 cm^2
5	b = 9.3 dm, c = 10.7 dm	a = 5.2 dm, b = 9.3 dm, c = 10.7 dm, u = 25.2 dm, A = 24.2 dm^2
6	a = 4 dm, b = 5.1 dm	a = 4 dm, b = 5.1 dm, c = 6.5 dm, u = 15.6 dm, A = 10.2 dm^2
7	a = 8.1 cm, b = 2 cm	a = 8.1 cm, b = 2 cm, c = 8.3 cm, u = 18.4 cm, A = 8.1 cm^2
8	b = 7 cm, c = 11.9 cm	a = 9.6 cm, b = 7 cm, c = 11.9 cm, u = 28.5 cm, A = 33.6 cm^2
9	a = 8.1 dm, c = 8.3 dm	a = 8.1 dm, b = 1.9 dm, c = 8.3 dm, u = 18.3 dm, A = 7.7 dm^2
10	a = 4 mm, c = 4.5 mm	a = 4 mm, b = 2.1 mm, c = 4.5 mm, u = 10.6 mm, A = 4.2 mm^2

Aufgabe 4: Berechne die fehlenden Größen im rechtwinkligen Dreieck ΔABC (Winkel γ = 90°, a, b = Katheten, c = Hypotenuse, A = Flächeninhalt, u = Umfang).

Nr.	*Gegeben:*
1	a = 4.8 cm, c = 4.9 cm
2	a = 1.5 mm, c = 3.5 mm
3	a = 8.3 dm, b = 9.7 dm
4	a = 5.8 m, c = 6.1 m
5	b = 8.8 cm, c = 11.8 cm
6	a = 4.4 dm, c = 10 dm
7	b = 4.6 cm, c = 7.7 cm
8	a = 4.7 mm, c = 5 mm
9	a = 1 mm, c = 8.7 mm
10	a = 8.4 dm, b = 7 dm
11	a = 3.7 m, c = 5.2 m
12	b = 1 cm, c = 4.5 cm
13	a = 1.9 dm, b = 3.1 dm
14	a = 3.1 m, c = 3.3 m
15	b = 8.2 cm, c = 9 cm
16	a = 2.9 cm, b = 3.5 cm
17	b = 5.8 cm, c = 8.1 cm
18	a = 4.1 dm, c = 7.9 dm

19	b = 5.8 dm, c = 6.8 dm
20	b = 1.9 cm, c = 9.9 cm

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

Lösungen:

Nr.	*Gegeben:*	*Lösungen:*
1	a = 4.8 cm, c = 4.9 cm	a = 4.8 cm, b = 1.2 cm, c = 4.9 cm, u = 10.9 cm, A = 2.9 cm^2
2	a = 1.5 mm, c = 3.5 mm	a = 1.5 mm, b = 3.2 mm, c = 3.5 mm, u = 8.2 mm, A = 2.4 mm^2
3	a = 8.3 dm, b = 9.7 dm	a = 8.3 dm, b = 9.7 dm, c = 12.8 dm, u = 30.8 dm, A = 40.3 dm^2
4	a = 5.8 m, c = 6.1 m	a = 5.8 m, b = 2 m, c = 6.1 m, u = 13.9 m, A = 5.8 m^2
5	b = 8.8 cm, c = 11.8 cm	a = 7.8 cm, b = 8.8 cm, c = 11.8 cm, u = 28.4 cm, A = 34.3 cm^2
6	a = 4.4 dm, c = 10 dm	a = 4.4 dm, b = 9 dm, c = 10 dm, u = 23.4 dm, A = 19.8 dm^2
7	b = 4.6 cm, c = 7.7 cm	a = 6.2 cm, b = 4.6 cm, c = 7.7 cm, u = 18.5 cm, A = 14.3 cm^2
8	a = 4.7 mm, c = 5 mm	a = 4.7 mm, b = 1.8 mm, c = 5 mm, u = 11.5 mm, A = 4.2 mm^2
9	a = 1 mm, c = 8.7 mm	a = 1 mm, b = 8.6 mm, c = 8.7 mm, u = 18.3 mm, A = 4.3 mm^2
10	a = 8.4 dm, b = 7 dm	a = 8.4 dm, b = 7 dm, c = 10.9 dm, u = 26.3 dm, A = 29.4 dm^2
11	a = 3.7 m, c = 5.2 m	a = 3.7 m, b = 3.6 m, c = 5.2 m, u = 12.5 m, A = 6.7 m^2
12	b = 1 cm, c = 4.5 cm	a = 4.4 cm, b = 1 cm, c = 4.5 cm, u = 9.9 cm, A = 2.2 cm^2
13	a = 1.9 dm, b = 3.1 dm	a = 1.9 dm, b = 3.1 dm, c = 3.6 dm, u = 8.6 dm, A = 2.9 dm^2
14	a = 3.1 m, c = 3.3 m	a = 3.1 m, b = 1.2 m, c = 3.3 m, u = 7.6 m, A = 1.9 m^2
15	b = 8.2 cm, c = 9 cm	a = 3.6 cm, b = 8.2 cm, c = 9 cm, u = 20.8 cm, A = 14.8 cm^2
16	a = 2.9 cm, b = 3.5 cm	a = 2.9 cm, b = 3.5 cm, c = 4.5 cm, u = 10.9 cm, A = 5.1 cm^2
17	b = 5.8 cm, c = 8.1 cm	a = 5.6 cm, b = 5.8 cm, c = 8.1 cm, u = 19.5 cm, A = 16.2 cm^2
18	a = 4.1 dm, c = 7.9 dm	a = 4.1 dm, b = 6.7 dm, c = 7.9 dm, u = 18.7 dm, A = 13.7 dm^2
19	b = 5.8 dm, c = 6.8 dm	a = 3.6 dm, b = 5.8 dm, c = 6.8 dm, u = 16.2 dm, A = 10.4 dm^2
20	b = 1.9 cm, c = 9.9 cm	a = 9.7 cm, b = 1.9 cm, c = 9.9 cm, u = 21.5 cm, A = 9.2 cm^2

Aufgabe 5: Berechne die fehlenden Größen im rechtwinkligen Dreieck ΔABC (Winkel γ = 90°, a, b = Katheten, c = Hypotenuse, A = Flächeninhalt, u = Umfang).

Nr.	*Gegeben:*
1	a = 4.9 dm, c = 10.2 dm
2	a = 11.7 dm, c = 13.6 dm
3	a = 9.9 dm, c = 18.3 dm
4	b = 23.6 cm, c = 25.6 cm
5	a = 3.7 m, c = 20 m
6	a = 7.7 dm, c = 18.9 dm
7	a = 6 dm, c = 15 dm
8	a = 9.6 cm, c = 21.4 cm
9	b = 11.1 dm, c = 11.5 dm
10	a = 16.4 cm, c = 17.5 cm
11	a = 5.7 mm, c = 9.3 mm
12	a = 9.8 mm, c = 24.3 mm
13	b = 17.3 cm, c = 24.6 cm
14	a = 4.7 dm, c = 12.8 dm
15	a = 19.7 m, b = 7 m
16	a = 19.1 m, b = 11 m
17	a = 11.7 m, c = 14.8 m

18	a = 15.3 cm, c = 21 cm
19	a = 7.7 m, c = 14.5 m
20	a = 5.7 cm, c = 24.8 cm

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

Lösungen:

Nr.	Gegeben:	Lösungen:
1	a = 4.9 dm, c = 10.2 dm	a = 4.9 dm, b = 9 dm, c = 10.2 dm, u = 24.1 dm, A = 22.1 dm^2
2	a = 11.7 dm, c = 13.6 dm	a = 11.7 dm, b = 7 dm, c = 13.6 dm, u = 32.3 dm, A = 41 dm^2
3	a = 9.9 dm, c = 18.3 dm	a = 9.9 dm, b = 15.4 dm, c = 18.3 dm, u = 43.6 dm, A = 76.2 dm^2
4	b = 23.6 cm, c = 25.6 cm	a = 9.9 cm, b = 23.6 cm, c = 25.6 cm, u = 59.1 cm, A = 116.8 cm^2
5	a = 3.7 m, c = 20 m	a = 3.7 m, b = 19.7 m, c = 20 m, u = 43.4 m, A = 36.4 m^2
6	a = 7.7 dm, c = 18.9 dm	a = 7.7 dm, b = 17.3 dm, c = 18.9 dm, u = 43.9 dm, A = 66.6 dm^2
7	a = 6 dm, c = 15 dm	a = 6 dm, b = 13.8 dm, c = 15 dm, u = 34.8 dm, A = 41.4 dm^2
8	a = 9.6 cm, c = 21.4 cm	a = 9.6 cm, b = 19.1 cm, c = 21.4 cm, u = 50.1 cm, A = 91.7 cm^2
9	b = 11.1 dm, c = 11.5 dm	a = 3 dm, b = 11.1 dm, c = 11.5 dm, u = 25.6 dm, A = 16.7 dm^2
10	a = 16.4 cm, c = 17.5 cm	a = 16.4 cm, b = 6 cm, c = 17.5 cm, u = 39.9 cm, A = 49.2 cm^2
11	a = 5.7 mm, c = 9.3 mm	a = 5.7 mm, b = 7.3 mm, c = 9.3 mm, u = 22.3 mm, A = 20.8 mm^2
12	a = 9.8 mm, c = 24.3 mm	a = 9.8 mm, b = 22.2 mm, c = 24.3 mm, u = 56.3 mm, A = 108.8 mm^2
13	b = 17.3 cm, c = 24.6 cm	a = 17.5 cm, b = 17.3 cm, c = 24.6 cm, u = 59.4 cm, A = 151.4 cm^2
14	a = 4.7 dm, c = 12.8 dm	a = 4.7 dm, b = 11.9 dm, c = 12.8 dm, u = 29.4 dm, A = 28 dm^2
15	a = 19.7 m, b = 7 m	a = 19.7 m, b = 7 m, c = 20.9 m, u = 47.6 m, A = 69 m^2
16	a = 19.1 m, b = 11 m	a = 19.1 m, b = 11 m, c = 22 m, u = 52.1 m, A = 105.1 m^2
17	a = 11.7 m, c = 14.8 m	a = 11.7 m, b = 9 m, c = 14.8 m, u = 35.5 m, A = 52.7 m^2
18	a = 15.3 cm, c = 21 cm	a = 15.3 cm, b = 14.4 cm, c = 21 cm, u = 50.7 cm, A = 110.2 cm^2
19	a = 7.7 m, c = 14.5 m	a = 7.7 m, b = 12.3 m, c = 14.5 m, u = 34.5 m, A = 47.4 m^2
20	a = 5.7 cm, c = 24.8 cm	a = 5.7 cm, b = 24.1 cm, c = 24.8 cm, u = 54.6 cm, A = 68.7 cm^2