Michael Buhlmann

Mathematik-Aufgabenpool
> Strahlensätze I

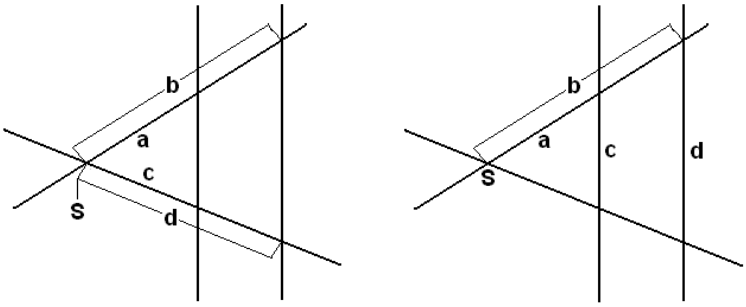
Einleitung: Es gilt die geometrische Situation: Zwei vom Strahlenzentrum S ausgehende Geraden werden von zwei parallelen Geraden geschnitten. Dann gilt der 1. Strahlensatz:

$$\frac{a}{b}=\frac{c}{d} \text{ bzw. } \frac{b}{a}=\frac{d}{c}$$

für jeweils zwei bei S beginnende Strecken a und b auf dem 1. sowie c und d auf dem zweiten Geradenstrahl. Ebenso gilt der 2. Strahlensatz:

$$\frac{a}{b}=\frac{c}{d} \text{ bzw. } \frac{b}{a}=\frac{d}{c}$$

für die zwei bei S beginnenden Strecken a und b auf einem Geradenstrahl sowie die Strecken c und d auf den Parallelen.



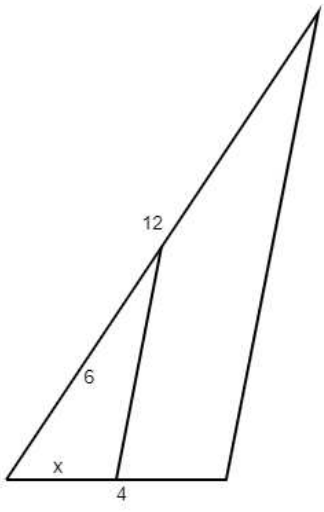
1. Strahlensatz | 2. Strahlensatz

Es gilt damit die Faustregel:

$$\frac{kurz}{lang}=\frac{kurz}{lang} \text{ bzw. } \frac{lang}{kurz}=\frac{lang}{kurz}.$$

Aufgabe 1: Berechne die fehlende Strecke x nach dem 1. Strahlensatz (alle Größen in cm):

a)



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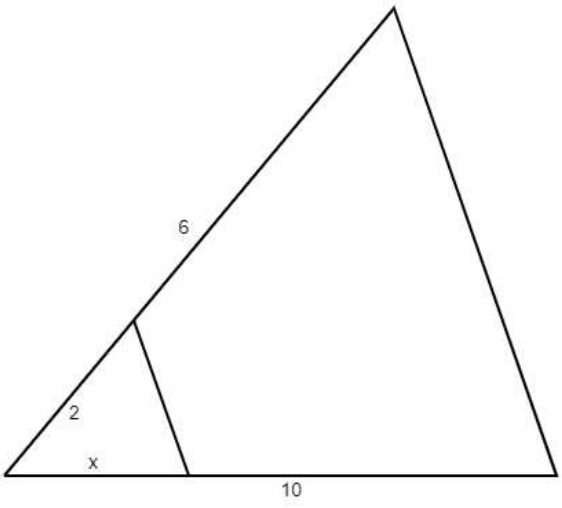
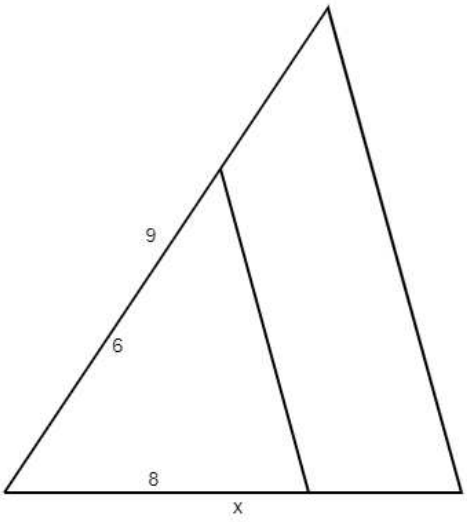


c)



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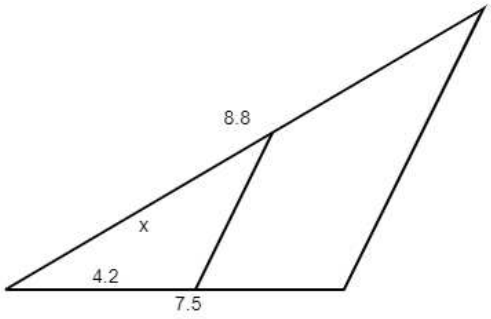
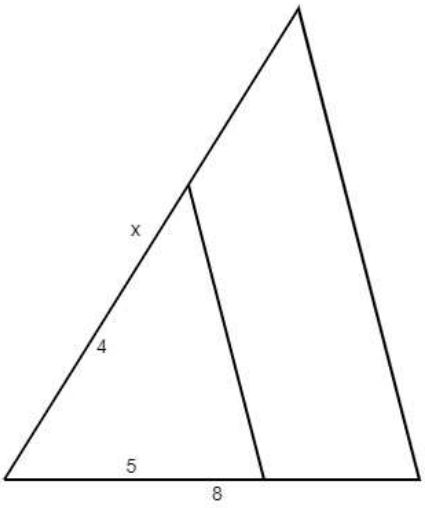


e)



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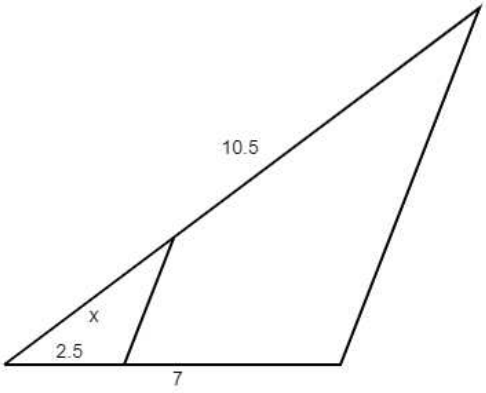
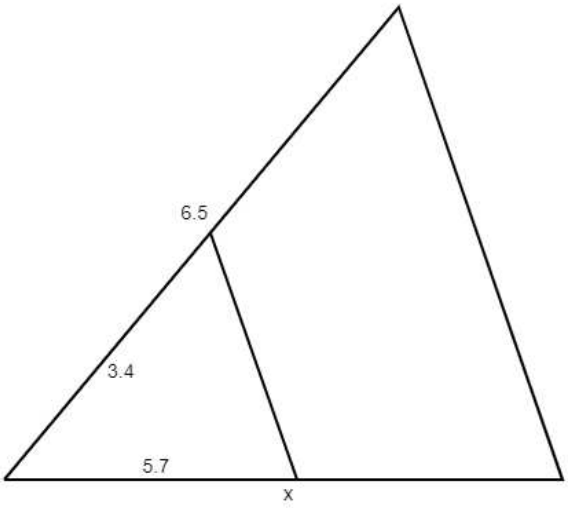
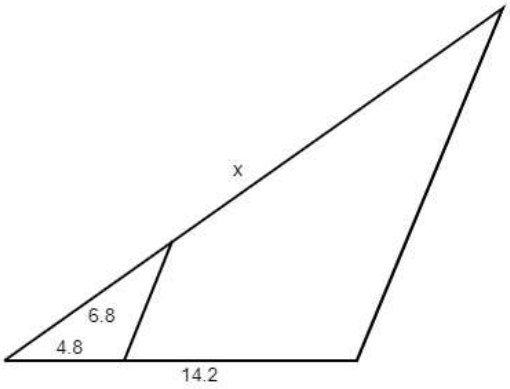


g)

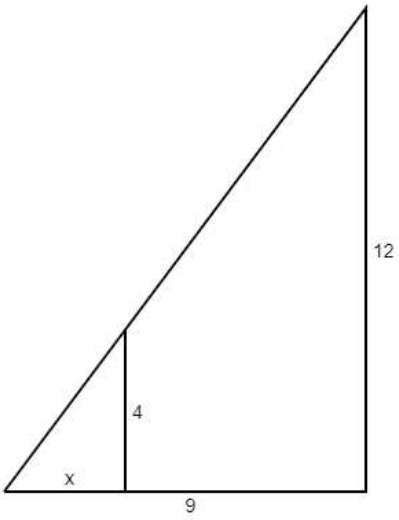


h)

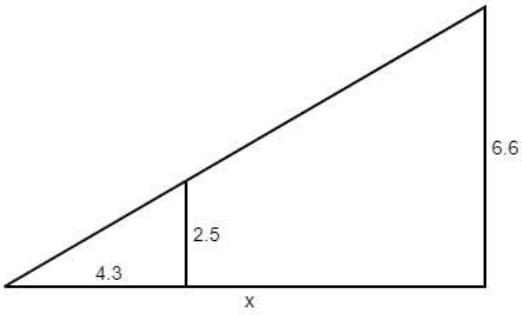


Aufgabe 2: Berechne die fehlende Strecke x nach dem 2. Strahlensatz (alle Größen in cm):

a)



b)



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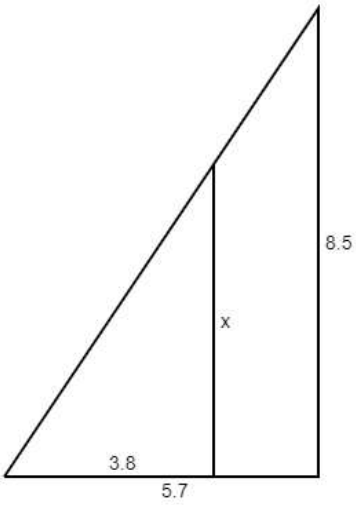

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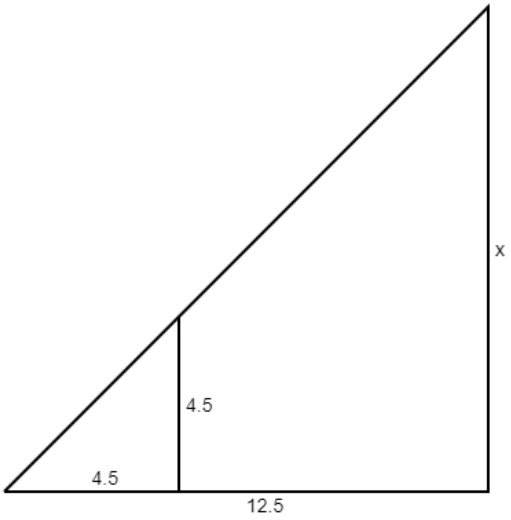
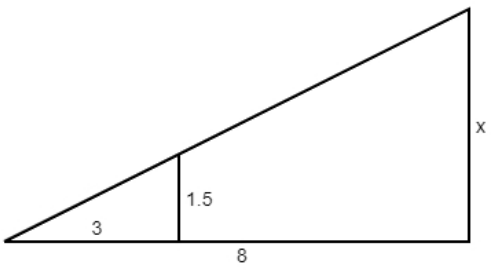


e)



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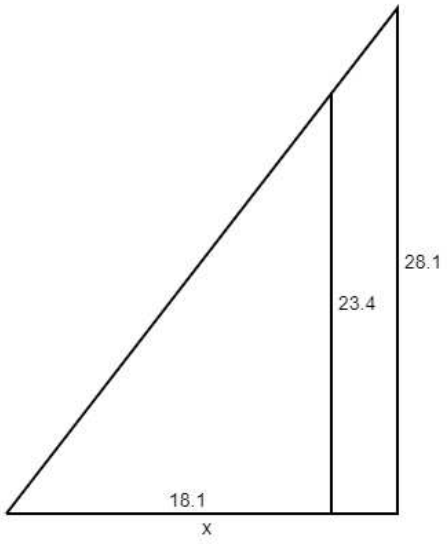
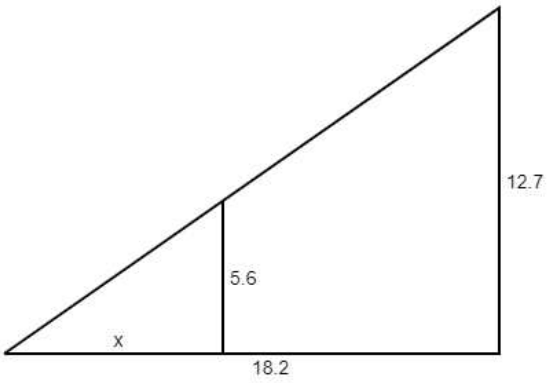
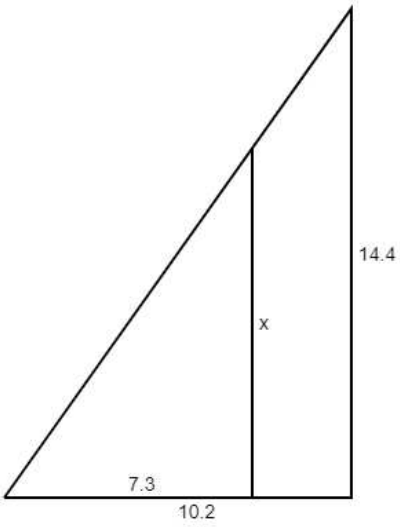


g)

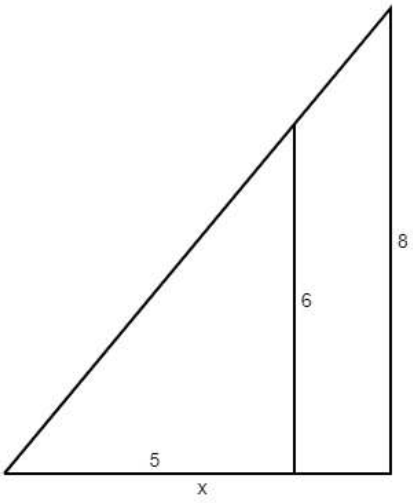


h)

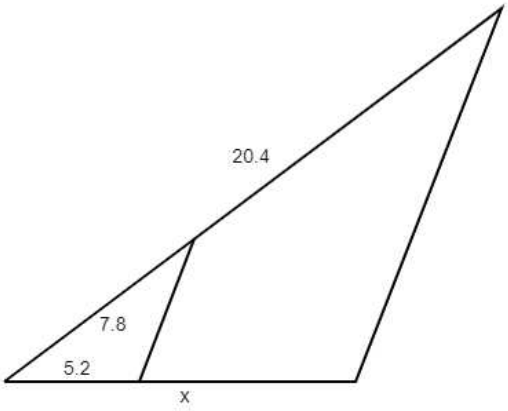


Aufgabe 3: Berechne die fehlende Strecke x nach dem 1. oder 2. Strahlensatz (alle Größen in cm):

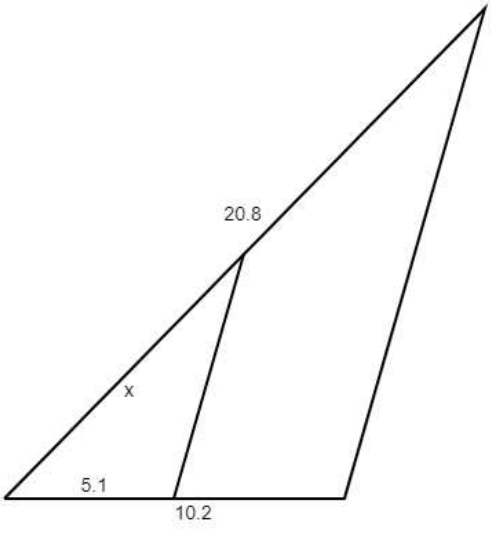
a)



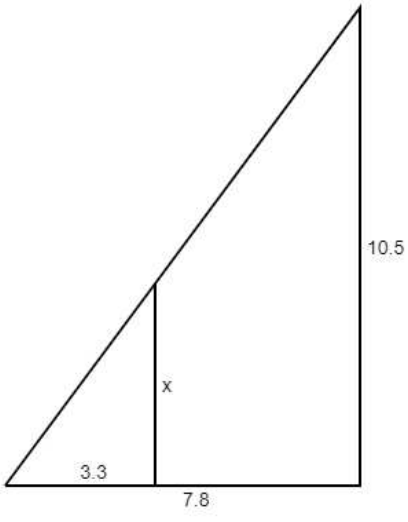
b)



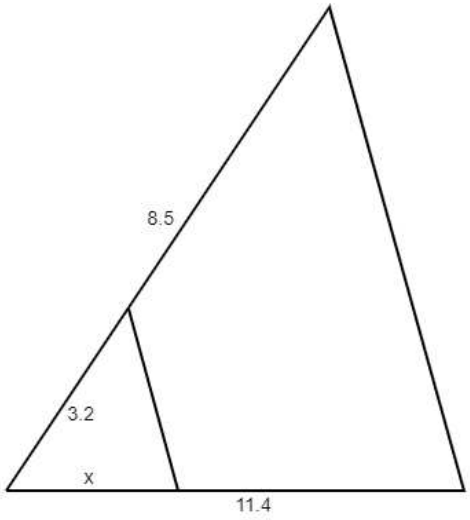
c)



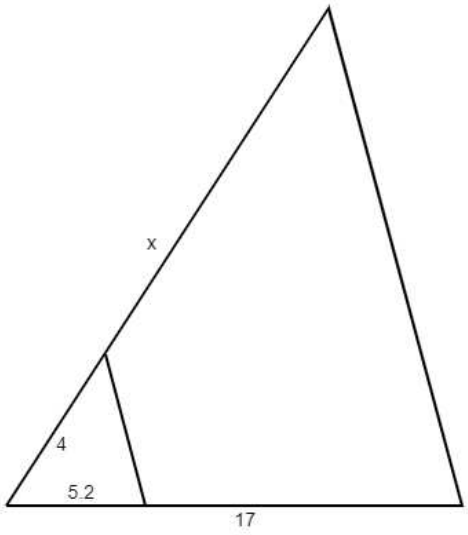
d)



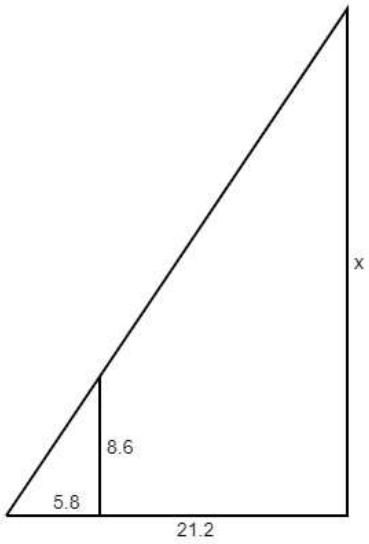
e)



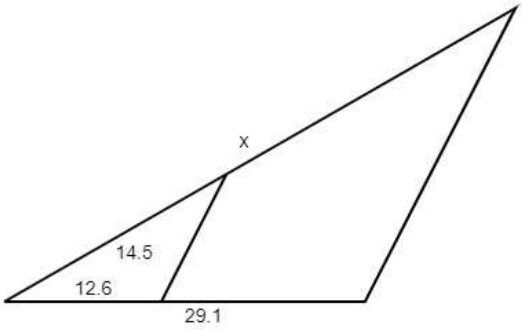
f)



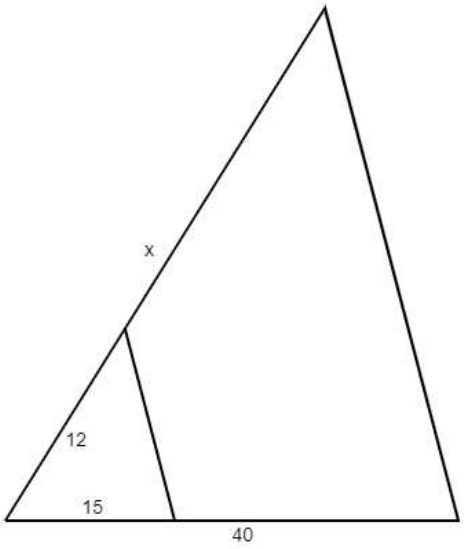
g)



h)



i)



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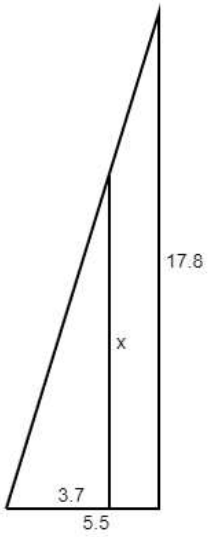

Aufgabe 1, Lösungen:

a) x/b = c/d => x/4 = 6/12 => x = 6/12·4 = 2 cm
b) x/b = c/d => x/10 = 2/6 => x = 2/6·10 = 3.3 cm
c) x/a = d/c => x/8 = 9/6 => x = 9/6·8 = 12 cm
d) x/d = a/b => x/8.8 = 4.2/7.5 => x = 4.2/7.5·8.8 = 4.9 cm
e) x/c = b/a => x/4 = 8/5 => x = 8/5·4 = 6.4 cm
f) x/d = a/b => x/10.5 = 2.5/7 => x = 2.5/7·10.5 = 3.75 cm
g) x/a = d/c => x/5.7 = 6.5/3.4 => x = 6.5/3.4·5.7 = 10.9 cm
h) x/c = b/a => x/6.8 = 14.2/4.8 => x = 14.2/4.8·6.8 = 20.1 cm.

Aufgabe 2, Lösungen:

a) x/b = c/d => x/9 = 4/12 => x = 4/12·9 = 3 cm
b) x/a = d/c => x/4.3 = 6.6/2.5 => x = 6.6/2.5·4.3 = 11.4 cm
c) x/d = a/b => x/8.5 = 3.8/5.7 => x = 3.8/5.7·8.5 = 5.7 cm
d) x/c = b/a => x/4.5 = 12.5/4.5 => x = 12.5/4.5·4.5 = 12.5 cm
e) x/c = b/a => x/1.5 = 8/3 => x = 8/3·1.5 = 4 cm
f) x/a = d/c => x/18.1 = 28.1/23.4 => x = 28.1/23.4·18.1 = 21.7 cm
g) x/b = c/d => x/18.2 = 5.6/12.7 => x = 5.6/12.7·18.2 = 8 cm
h) x/d = a/b => x/14.4 = 7.3/10.2 => x = 7.3/10.2·14.4 = 10.3 cm.

Aufgabe 3, Lösungen:

a) x/a = d/c => x/5 = 8/6 => x = 8/6·5 = 6.7 cm
b) x/a = d/c => x/5.2 = 20.4/7.8 => x = 20.4/7.8·5.2 = 13.6 cm
c) x/d = a/b => x/20.8 = 5.1/10.2 => x = 5.1/10.2·20.8 = 10.4 cm
d) x/d = a/b => x/10.5 = 3.3/7.8 => x = 3.3/7.8·10.5 = 4.4 cm
e) x/b = c/d => x/11.4 = 3.2/8.5 => x = 3.2/8.5·11.4 = 4.3 cm
f) x/c = b/a => x/4 = 17/5.2 => x = 17/5.2·4 = 13.1 cm
g) x/c = b/a => x/8.6 = 21.2/5.8 => x = 21.2/5.8·8.6 = 31.4 cm
h) x/c = b/a => x/14.5 = 29.1/12.6 => x = 29.1/12.6·14.5 = 33.5 cm
i) x/c = b/a => x/12 = 40/15 => x = 40/15·12 = 32 cm
j) x/d = a/b => x/17.8 = 3.7/5.5 => x = 3.7/5.5·17.8 = 12 cm.

(cm = Zentimeter)

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