Harjoittele s.146

68 Kertaustehtäviä

810

	Kolmio DEF	Kolmio ABC
a) Vastinpisteet	D E F	A B C
Vastinkulmat	∡D ∡E ∡F	∡A ∡E ∡F
Vastinsivut	DE EF FD	AB BC CA

b) $\frac{DE}{AB} = \frac{8}{4} = \underline{\underline{2}}$

---

811 Mittakaava kuva : alkuperäinen

60 : 20 (jaetaan molemmat luvulla 20)

3 : 1

---

812 a)

Pituus kartalla	Pituus luonnossa
1 cm	300 m
2 cm	2 · 300 m = 600 m
5 cm	5 · 300 m = 1500 m
7 cm	7 · 300 m = 2100 m

b) mittakaava kuva : alkuperäinen

1 cm : 300 m

1 cm : 30000 cm muista: Sama yksikkö!

1 : 30 000

---

813 Kolmiot ovat yhdenmuotoiset, jos niillä on kaksi yhtä suurta kulmaa

	Kolmio ABC	Kolmio DEF
Kulmat	55°	55°
	24°	101°
	180° − 55° − 24° = 101°	

V: Kaksi yhtä suurta kulmaa ⇒ Kolmiot ovat yhdenmuotoiset

Harjoittele s.146

68 Kertaustehtäviä

814 Vastinsivujen suhdeluvut ovat yhtä suuret

$\frac{x}{8} = \frac{7,5}{5}$ kerrotaan ristiin

$5x = 8 \cdot 7,5$ $\quad | :5$

$x = \frac{8 \cdot 7,5}{5}$

$x = 12$ cm

815

a) $x^2 = 3^2 + 4^2$
$x^2 = 9 + 16$
$x^2 = 25$
$x = \sqrt{25}$
$x = 5$

b) $x^2 + 12^2 = 13^2$
$x^2 = 13^2 - 12^2$
$x^2 = 169 - 144$
$x^2 = 25$
$x = 5$

c) $x^2 + 21^2 = 29^2$
$x^2 = 29^2 - 21^2$
$x^2 = 841 - 441$
$x^2 = 400$
$x = \sqrt{400}$
$x = 20$

d) $x^2 = 15^2 + 20^2$
$x^2 = 225 + 400$
$x^2 = 625$
$x = \sqrt{625}$
$x = 25$

816

a)

(m)

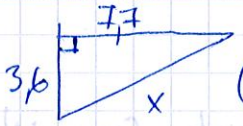
$x^2 + 12^2 = 15^2$
$x^2 = 15^2 - 12^2$
$x^2 = 225 - 144$
$x^2 = 81$
$x = \sqrt{81}$
$x = 9$ m

b)

(cm)

$x^2 + 3^2 = 7^2$
$x^2 = 7^2 - 3^2$
$x^2 = 49 - 9$
$x = \sqrt{40}$
$x \approx 6,3$ cm

817

a) 

(cm)

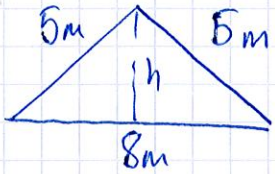
$x^2 = 3,6^2 + 7,7^2$
$x = \sqrt{3,6^2 + 7,7^2}$
$x = 8,5$ cm

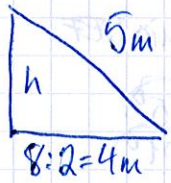
b)

(m)

$x^2 = 80^2 + 39^2$
$x = \sqrt{80^2 + 39^2}$
$x = 89$ m

818



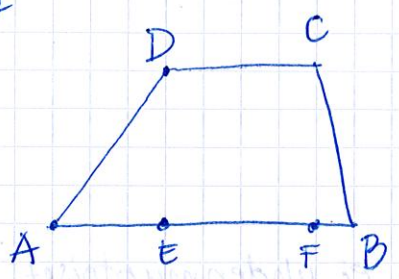


$h^2 + 4^2 = 5^2$
$h^2 = 5^2 - 4^2$
$h = \sqrt{5^2 - 4^2}$
$h = \sqrt{25 - 16}$
$h = \sqrt{9}$
$h = 3$m

Sovella s.147

68 Kertaustehtäviä

819



a) 3:4

$\frac{3}{4}AB = \frac{3}{4}\cdot 8 = \frac{3\cdot 8}{4} = 3\cdot 2 = 6$

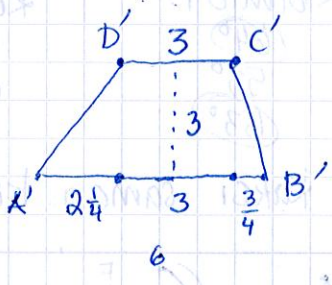
$\frac{3}{4}DC = \frac{3}{4}\cdot 4 = \frac{3\cdot 4}{4} = 3$

$\frac{3}{4}\cdot$ korkeus $= \frac{3}{4}\cdot 4 = 3$

$\frac{3}{4}\cdot AE = \frac{3\cdot 3}{4} = \frac{9}{4} = 2\frac{1}{4}$

$\frac{3}{4}EF = \frac{3}{4}\cdot 4 = 3$

$\frac{3}{4}FB = \frac{3}{4}\cdot 1 = \frac{3}{4}$



b) 3:2

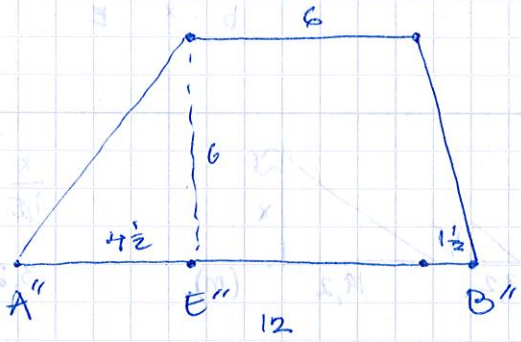
$\frac{3}{2}AB = \frac{3}{2}\cdot 8 = \frac{24}{2} = 12$

$\frac{3}{2}DC = \frac{3}{2}\cdot 4 = \frac{12}{2} = 6$

$\frac{3}{2}\cdot$ korkeus $= \frac{3}{2}\cdot 4 = \frac{12}{2} = 6$

$\frac{3}{2}AE = \frac{3}{2}\cdot 3 = \frac{9}{2} = 4\frac{1}{2}$

$\frac{3}{2}\cdot FB = \frac{3}{2}\cdot 1 = 1\frac{1}{2}$



---

820 Mittakaava kuva : alkuperäinen

a) 4 cm : 20 km
4 cm : 20 000 00 cm ||:4
1 : 5 000 00

V: 1: 500000

b) 3 cm : 600 m
3 cm : 60000 cm ||:3
1 : 20000

V: 1: 20 000

Sovella s.147

68 Kertaustehtäviä

821 a) Kolmio 1 — Kolmio 2

$64°$ — $53°$

$58°$ — $53°$

$180° - 64° - 53° = 63°$

V: Vain yksi kulma sama ⇒ ei yhdenmuotoiset

b) Kolmio 1 — Kolmio 2

$64°$ — $63°$

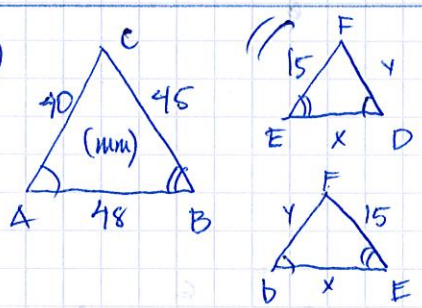
$53°$ — $64°$

$63°$

V: Kaksi samaa kulmaa ⇒ kolmiot ovat yhdenmuotoiset

---

822 a)



a) $\frac{x}{48} = \frac{15}{45}$

$45x = 48 \cdot 15$

$x = \frac{48 \cdot 15}{45}$

$x = 16$ mm

b) $\frac{Y}{40} = \frac{15}{45}$

$45y = 40 \cdot 15$

$y = \frac{40 \cdot 15}{45}$

$y = 13\frac{1}{3}$ mm

$y \approx 13$ mm (kaksi nroa)

823

$\frac{x}{1,5} = \frac{19,2}{3,2}$

$3,2x = 1,5 \cdot 19,2$

$x = \frac{1,5 \cdot 19,2}{3,2}$

$x = 9$ m

824

a) $4^2 + 7^2 = 8^2$

$16 + 49 = 64$

$65 = 65$

V: ei ole

b) $12^2 + 9^2 = 15^2$

$144 + 81 = 225$

$225 = 225$

V: on

c) $30^2 + 45^2 = 55^2$

$900 + 2025 = 3025$

$2925 = 3025$

V: ei ole

d) $13^2 + 84^2 = 85^2$

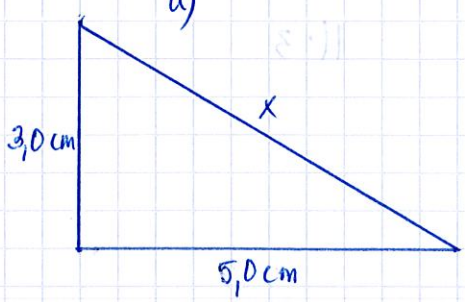
$169 + 7056 = 7225$

$7225 = 7225$

V: on

---

825 a)



b) $x^2 = 5^2 + 3^2$

$x^2 = 25 + 9$

$x^2 = 34$

$x = \sqrt{34}$

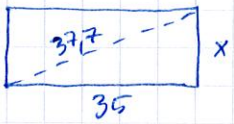
$x \approx 5,8$ cm

c) mittaus 5,8 cm

Sovella s. 147

68 Kertaustehtäviä

826

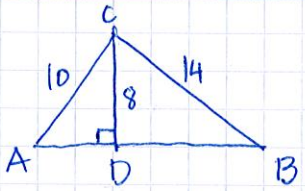


a) $x^2 + 35^2 = 37{,}7^2$
$x^2 = 37{,}7^2 - 35^2$
$x = \sqrt{37{,}7^2 - 35^2}$
$x \approx 14{,}0$ cm

b) $p = 14{,}0$ cm $+ 35$ cm $+ 35{,}0$ cm $+ 14$ cm (suorakulmio!)
$= 98{,}0$ cm

c) A = kanta · korkeus
$= 35$ cm $\cdot 14$ cm
$= 490$ cm^2

827

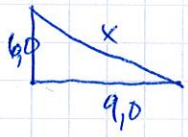


AD:n pituus $AD^2 + 8^2 = 10^2$
$AD^2 = 10^2 - 8^2$
$AD = \sqrt{100 - 64}$
$AD = \sqrt{36}$
$AD = 6$

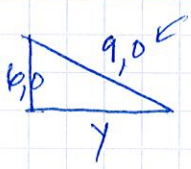
DB:n pituus $DB^2 + 8^2 = 14^2$
$DB^2 = 14^2 - 8^2$
$DB = \sqrt{14^2 - 8^2}$
$DB \approx 11{,}48$ cm

$AB = AD + DB = 6$ cm $+ 11{,}48$ cm $= 17{,}48$ cm ≈ 17 cm (kaksi nroa)

828



tai



kaksi nroa

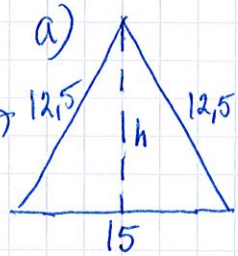
$x^2 = 6^2 + 9^2$
$x^2 = 36 + 81$
$x = \sqrt{117}$
$x \approx 11$ cm

$y^2 + 6^2 = 9^2$
$y^2 = 9^2 - 6^2$
$y = \sqrt{45}$
$y \approx 6{,}7$ cm

(kaksi nroa)
V: 11 cm tai 6,7 cm

829

a)



kolme ~~kuku~~ nroa

(cm)

b) $h^2 + 7{,}5^2 = 12{,}5^2$
$h^2 = 12{,}5^2 - 7{,}5^2$
$h = \sqrt{12{,}5^2 - 7{,}5^2}$
$h = 10$ cm

kolme nroa
V: 10,0 cm

c) $A = \frac{\text{kanta} \cdot \text{korkeus}}{2}$
$= \frac{15 \text{ cm} \cdot 10 \text{ cm}}{2}$
$= \frac{150 \text{ cm}^2}{2}$
$= 75$ cm^2

75,0 cm^2
kolme nroa