Harjoitus s.143 — Pythagoraan lauseen harjoitteita

789

a) $x^2 = 55^2 + 48^2$
$x^2 = 5329$
$x = \sqrt{5329}$
$x = 79$

b) $588^2 + x^2 = 637^2$
$x^2 = 637^2 - 588^2$
$x^2 = 60025$
$x = \sqrt{60025}$
$x = 245$

790

kat. 28  45 kat.

53
hypot.

V: $28^2 + 45^2 = 53^2$
$45^2 + 28^2 = 53^2$

791

Kolmio on suorakulmainen, jos Pythagoraan lause toteutuu. Pisin sivu on hypotenuusa.

a) $7^2 + 24^2 = 25^2$
$49 + 576 = 625$
$625 = 625$

V: Kolmio on suorakulmainen

b) $16^2 + 34^2 = 34^2$
$256 + 961 =$
$1217 = 1156$

V: Kolmio ei ole suorakulmainen

792

a) $9^2 + 5{,}6^2 = x^2$
$x^2 = 9^2 + 5{,}6^2$
$x = \sqrt{9^2 + 5{,}6^2}$
$x \approx 11$ cm
(kaksi merkitsevää numeroa)

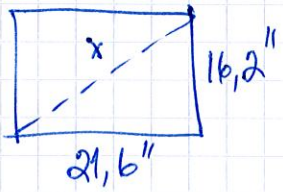
b) $32^2 + 24^2 = x^2$
$x^2 = 32^2 + 24^2$
$x = \sqrt{32^2 + 24^2}$
$x = 40$ m

793

a) $x^2 + 3^2 = 4{,}2^2$ (cm)
$x^2 = 4{,}2^2 - 3^2$
$x = \sqrt{4{,}2^2 - 3^2}$
$x \approx 2{,}9$ cm

b) $x^2 + 27^2 = 31^2$ (mm)
$x^2 = 31^2 - 27^2$
$x = \sqrt{31^2 - 27^2}$
$x \approx 15$ mm

794



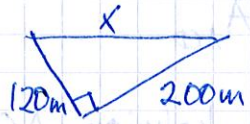
$x^2 = 16{,}2^2 + 21{,}6^2$ (tuumaa)
$x = \sqrt{16{,}2^2 + 21{,}6^2}$
$x \approx 27''$

Sovella s.143

66 Pythageraan lauseen harjoittelua

795

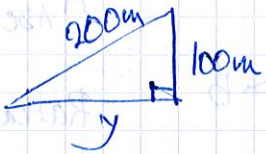
a)



$x^2 = 120^2 + 200^2$

$x = \sqrt{120^2 + 200^2}$

$x \approx 233\,m$



$y^2 + 100^2 = 200^2$

$y^2 = 200^2 - 100^2$

$y = \sqrt{200^2 - 100^2}$

$y \approx 173\,m$

c) $p = 120\,m + 233\,m + 100\,m + 173\,m = 626\,m$

d) $A = A_1 + A_2 = \frac{120\,m \cdot 200\,m}{2} + \frac{173\,m \cdot 100\,m}{2}$

$= 12\,000\,m^2 + 8650\,m^2$

$= 20\,650\,m^2$

$\approx 20\,700\,m^2$

796

$x^2 + 1{,}6^2 = 3{,}4^2$

$x^2 = 3{,}4^2 - 1{,}6^2$

$x = \sqrt{3{,}4^2 - 1{,}6^2}$

$x = 3\ cm$

Muutetaan PITUUSmitat mittakaavan 1:5000 mukaisesti

kanta $5000 \cdot 3\,cm = 15000\,cm = 150\,m$

korkeus $5000 \cdot 1{,}6\,cm = 8000\,cm = 80\,m$

$A = \frac{150\,m \cdot 80\,m}{2} = 6000\,m^2 = \underline{\underline{60\,a}}$

797

a)

$x^2 + 2^2 = 8^2$

$x = \sqrt{8^2 - 2^2}$

$x = \sqrt{64 - 4}$

$x = \sqrt{60}$

$x \approx 7{,}7\,cm$

b)

$y^2 = 4^2 + (\sqrt{60})^2$

$y^2 = 4^2 + 60$

$y^2 = 16 + 60$

$y^2 = 76$

$y = \sqrt{76}$

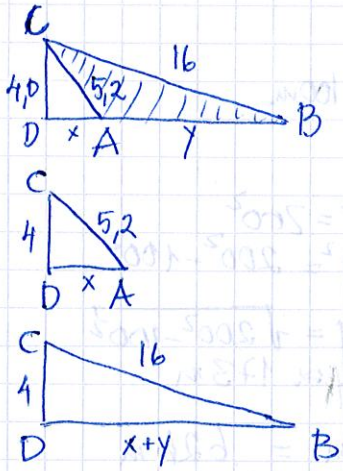
$y \approx 8{,}7\,cm$

Käytä tarkkaa arvoa!

Sovella
s. 143

66 Pythagoraan lauseen harjoittelua

798



$A_{ABC} = A_{BCD} - A_{ACD}$

Ratkaistaan ensin kolmion ACD kateetti x

$x^2 + 4^2 = 5{,}2^2$

$x^2 = 5{,}2^2 - 4^2$

$x = \sqrt{5{,}2^2 - 4^2}$

$x \approx 3{,}32$ cm

Ratkaistaan kolmion ACD kateetti (x+y)

$(x+y)^2 + 4^2 = 16^2$

$x+y = \sqrt{16^2 - 4^2}$

$x+y \approx 15{,}49$ cm

$A_{ABC} = A_{BCD} - A_{ACD}$

$= \frac{15{,}49 \cdot 4}{2} - \frac{3{,}32 \cdot 4}{2}$

$= 24{,}34$ cm^2

$\approx \underline{\underline{24 \text{ cm}^2}}$

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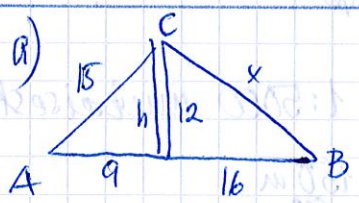
799 a)



$h^2 + 9^2 = 15^2$

$h^2 = 15^2 - 9^2$

$h = \sqrt{15^2 - 9^2}$

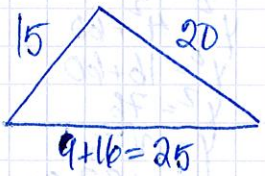
$h = 12$

$x^2 = 12^2 + 16^2$

$x = \sqrt{12^2 + 16^2}$

$\underline{\underline{x = 20}}$

b) ABC:n suorakulmaisuus



$15^2 + 20^2 = 25^2$

$225 + 400 = 625$

$625 = 625$

V: Kolmio ABC on suorakulmainen