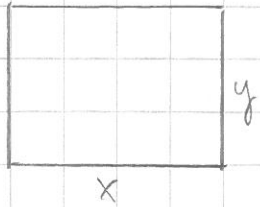


14. Suorakulmio

14.2



aitoa: $2x + 2y = 164 \quad | :2 \quad \Leftrightarrow x + y = 82$

$\Leftrightarrow y = 82 - x$

a) pinta-ala: $xy = \underline{x(82-x)} \quad (= 82x - x^2)$

b) $x(82-x) = 1600 \quad \Leftrightarrow 82x - x^2 = 1600$

$\Leftrightarrow -x^2 + 82x - 1600 = 0 \quad \Leftrightarrow \underline{x} = \frac{-82 \pm \sqrt{82^2 - 4 \cdot (-1) \cdot (-1600)}}{2 \cdot (-1)} = \frac{-82 \pm \sqrt{324}}{-2}$

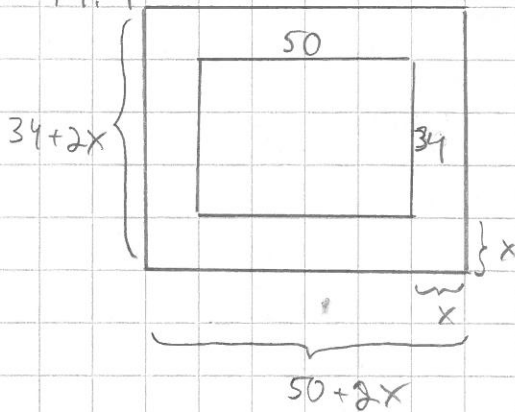
$= \frac{-82 \pm 18}{-2} = \begin{cases} \frac{-64}{-2} = 32 \\ \frac{-100}{-2} = 50 \end{cases}$

c) $x = 32: y = 82 - x = 82 - 32 = 50 \quad \leftarrow$ sama tilanne

$x = 50: y = 82 - x = 82 - 50 = 32 \quad \leftarrow$

Vast. mitat: 32 m ja 50 m

14.4



pinta-ala yhtälö:

$(34+2x)(50+2x) = 2145$

$\Leftrightarrow 1700 + 68x + 100x + 4x^2 = 2145$

$\Leftrightarrow 4x^2 + 168x - 445 = 0$

$\Leftrightarrow x = \frac{-168 \pm \sqrt{168^2 - 4 \cdot 4 \cdot (-445)}}{2 \cdot 4} = \frac{-168 \pm \sqrt{35344}}{8}$

$= \frac{-168 \pm 188}{8} = \begin{cases} \frac{20}{8} = \frac{5}{2} = 2.5 \\ \frac{-356}{8} < 0 \end{cases}$

Vast. 2.5 m

14.8



aitoa: $x + 3y = 15 \quad | :3 \quad \Leftrightarrow \frac{1}{3}x + y = 5$

pinta-ala: $xy \geq 12 \quad \leftarrow$ $\Leftrightarrow y = 5 - \frac{1}{3}x$

$\Rightarrow x(5 - \frac{1}{3}x) \geq 12 \quad \Leftrightarrow 5x - \frac{1}{3}x^2 \geq 12 \quad | \cdot 3 > 0$

$-x^2 + 15x - 36 \geq 0$

Vastaus yhtälö: $-x^2 + 15x - 36 = 0$

$\Leftrightarrow x = \frac{-15 \pm \sqrt{15^2 - 4 \cdot (-1) \cdot (-36)}}{2 \cdot (-1)} = \frac{-15 \pm \sqrt{81}}{-2} = \frac{-15 \pm 9}{-2} = \begin{cases} \frac{-6}{-2} = 3 \\ \frac{-24}{-2} = 12 \end{cases}$



$3 \leq x \leq 12$

Vast. seinän summataulukon sille: 3 m ... 12 m

14.16