

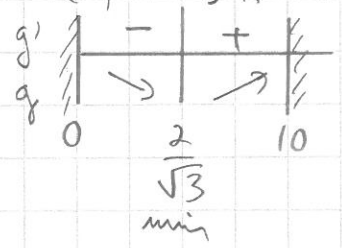
$$(\Rightarrow) -\sqrt{x^2+4} + 2x = 0$$

$$(\Rightarrow) 2x = \sqrt{x^2+4} \quad | (\)^2, \text{ mol. puol. } \geq 0 \text{ km } x \geq 0$$

$$(\Rightarrow) (2x)^2 = (\sqrt{x^2+4})^2$$

$$(\Rightarrow) 4x^2 = x^2 + 4$$

$$(\Rightarrow) 3x^2 = 4 \quad | :3 \quad (\Rightarrow) x^2 = \frac{4}{3} \quad | \sqrt{\quad} \quad (\Rightarrow) x = \pm \sqrt{\frac{4}{3}} = \frac{2}{\sqrt{3}} \approx 1,15$$



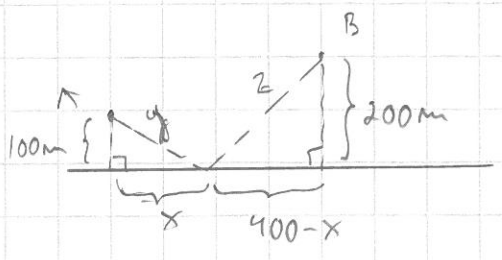
$$g'(1) \approx -0,11 < 0$$

$$g'(2) = 0,41 > 0$$

$$10 - \frac{2}{\sqrt{3}} \approx 8,845 \quad (\cdot 100 \text{ m})$$

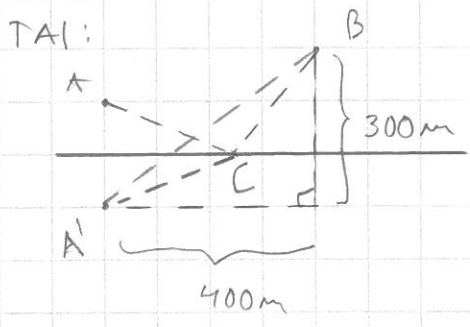
Vast. Tie rulla pitkin n. 880m ja sitten suoraa tietä läpi pöytäseen (10,2)

17.10



Reitin pituus:

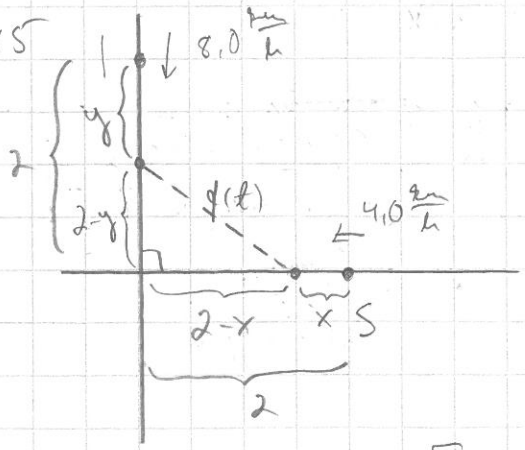
$$f(x) = y + z = \sqrt{x^2 + 100^2} + \sqrt{(400-x)^2 + 200^2}$$



Reitti: A → C → B on ylitseilto-käsin reitti: A' → C → B (symmetria) jälkimmäinen on lyhin km se on suure jano jolloin sen pituus on

$$\sqrt{(400\text{m})^2 + (300\text{m})^2} = \underline{500\text{m}}$$

17.15



aikaa kulunut: t (h)

$$x = 4t \text{ (km)}$$

$$y = 8t \text{ (km)}$$

Saoranjä jrisen välinen etäisyys:

$$f(t) = \sqrt{(2-x)^2 + (2-y)^2} = \sqrt{(2-4t)^2 + (2-8t)^2} = g(t)$$

\sqrt{x} on aidosti kasvava $\Rightarrow f(t)$ on pienin km $g(t)$ on pienin, g jälk. j' deriiv. km $t \geq 0$

$$g'(t) = 2(2-4t)' \cdot (-4) + 2(2-8t)' \cdot (-8) = -8(2-4t) - 16(2-8t)$$

$$= -16 + 32t - 32 + 128t = 160t - 48 = 0 \quad (\Rightarrow) t = \frac{48}{160} = \frac{3}{10}$$