Reistijd

1. $v_{A \to B} = 20 + v \quad \rightarrow \quad t_{heen} = \dfrac{10}{20 + v}$

$v_{B \to A} = 20 - v \quad \rightarrow \quad t_{terug} = \dfrac{10}{20 - v}$

$t_{totaal} = t_{heen} + t_{terug} = \dfrac{10}{20 + v} + \dfrac{10}{20 - v}$

2. $\dfrac{10}{20 + v} + \dfrac{10}{20 - v} = 2 \quad \rightarrow \quad v = 14{,}14$ km/uur

Of met de GR:

$y_1 = \dfrac{10}{20 + x} + \dfrac{10}{20 - x} \qquad y_2 = 2$

intersect $x = 14.14 \quad \rightarrow \quad v = 14{,}14$ km/uur

3. $T' = 10 \cdot (-1) \cdot (20 + v)^{-2} + 10 \cdot (-1) \cdot (20 - v)^{-2} \cdot (-1) = \dfrac{-10}{(20 + v)^2} + \dfrac{10}{(20 - v)^2}$

$T' = \dfrac{-10 \cdot (20 - v)^2 + 10 \cdot (20 + v)^2}{((20 + v) \cdot (20 - v))^2} = \dfrac{800 \cdot v}{((20 + v) \cdot (20 - v))^2}$

$T' = 0 : v = 0 \qquad T'$ 0 ++++++++++ o ++++++++++ (0 en 20)

$T' > 0$ voor alle v. ($v \neq 20$)

4. Met de GR:

$\text{sum}\left(\text{seq}\left(\dfrac{10}{20 + x/10} + \dfrac{10}{20 - x/10}, x, 0, 100, 1\right)\right) = 111{,}03$

$111{,}03 / 101 = 1{,}099$ uur $\quad \rightarrow \quad$ 66 min

5. $\dfrac{1}{10}\int_0^{10} T(v)\,dv = \dfrac{1}{10}\left[10 \ln(20 + v) - \ln(20 - v)\right]_0^{10} = {}^1\!/_{10}\left(10 \ln({}^{30}\!/_{10}) - 10 \ln({}^{20}\!/_{20})\right) = \ln 3$