Answer on Question #62089 – Math – Algebra

Question

Matti wants to cover a 6 mile course in 1 hour by running part of the course and walking the rest. He also wants to make a 5-minute stop for water. He runs at 8mi/h and walks 3mi/h. What is the minimum distance that Matt will need to run to complete the course in 1 hour?

Solution

The total time of movement (without a 5-minute stop) is $1-\frac{5}{60}=\frac{55}{60}$ (hour).
Let x be the running distance, then $(6-x)$ will be the walking distance, $\frac{x}{8}$ will be the running time, $\frac{6-x}{3}$ will be the walking time.
Then

$\frac{x}{8}+\frac{6-x}{3}\leq\frac{55}{60}$,

$\frac{3x}{24}+\frac{8(6-x)}{24}\leq\frac{55}{60}$,

$\frac{3x+8(6-x)}{24}\leq\frac{55}{60}$,

$\frac{3x+48-8x}{24}\leq\frac{55}{60}$,

$\frac{48-5x}{24}-\frac{55}{60}\leq 0$,

$\frac{5(48-5x)}{24\times5}-\frac{2\times55}{60\times2}\leq 0$,

$\frac{5(48-5x)-2\times55}{120}\leq 0$,

$\frac{240-25x-110}{120}\leq 0$,

$\frac{130-25x}{120}\leq 0$,

$130-25x\leq 0$,

$25x\geq 130$,

$x\geq\frac{130}{25}$,

$x\geq 5.2$.

Hence 5.2 miles is the minimum running distance.

Answer: 5.2 miles.