While she was jogging, Christine briefly broke into a sprint. Her velocity after t sec was $V(t) = \frac{1500}{100 + (t-5)^2} - 7$ m/s.

Compute her average velocity over the 10s duration of the sprint.

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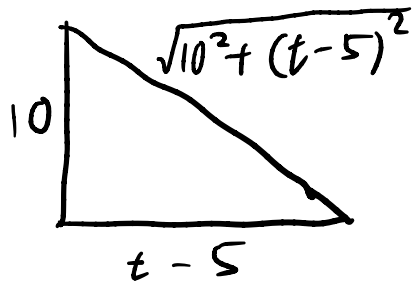
12/8/25



$$\text{Average velocity} = \frac{1}{10-0}\int_0^{10} \frac{1500}{100+(t-5)^2} - 7\,dt$$

$$= \frac{1}{10}\int_0^{10} 150\cdot\frac{10}{10^2+(t-5)^2} - 7\,dt$$

$$= \frac{1}{10}\left(150\arctan\left(\frac{t-5}{10}\right) - 7t\right)\Big|_0^{10}$$

$$= \frac{1}{10}\left(150\arctan\left(\frac{1}{2}\right) - 70\right) - \left(150\arctan\left(-\frac{1}{2}\right) - 0\right)$$

$$= \frac{1}{10}\left(-0.45289 - (-69.5471)\right)$$

$$= 6.909 \text{ m/s}$$