

Calculus Study Guide: section 5.5

One-dimensional motion: A particle moves along the a horizontal number line with velocity $v(t) = 26t - t^2$.

What is the total distance the particle travels on the time interval (0, 30)?

$$\int_0^{30} |v(t)| dt = 3158.666$$

answer: _____

What is the displacement for the particle on (0, 30)?

$$\int_0^{30} v(t) dt = 2700$$

answer: _____

A snowstorm hits the town, and the rate of snowfall (in/hr) is given by $s'(t) = 2 \sin \frac{\pi}{5} t$. The storm starts at $t = 0$ and last for 5 hours.

How much snow does the storm drop on the town?

$$2 \int_0^5 \sin \frac{\pi}{5} t dt = -2 \cdot \frac{5}{\pi} \cos \frac{\pi}{5} t \Big|_0^5$$

$$= -\frac{10}{\pi} (\cos \pi - \cos 0) = -\frac{10}{\pi} (-1 - 1) = \frac{20}{\pi} \text{ inches}$$

answer: _____