Jill has been walking for 8 min ± 2 min. She has been gone a distance of 128 m ± 16 m.

What is the uncertainty Δv in her speed $v = \dfrac{d}{t} = \dfrac{(128\text{ m})}{(8\text{ min})} = 16\text{ m/min}$?

A) $\Delta v = 2$ m/min
B) $\Delta v = 3$ m/min
C) $\Delta v = 4$ m/min
D) $\Delta v = 5$ m/min
E) $\Delta v = 6$ m/min

A first-order approximation is

$$\begin{aligned}
\Delta v &= \left|\frac{\partial v}{\partial t}\right| \Delta t + \left|\frac{\partial v}{\partial d}\right| \Delta d \\
&= \left|-\frac{d}{t^2}\right| \Delta t + \left|+\frac{1}{t}\right| \Delta d \\
&= \frac{(128\text{ m})}{(8\text{ min})^2}\,(2\text{ min}) + \frac{1}{(8\text{ min})}\,(16\text{ m}) \\
&= (4\text{ m/min}) + (2\text{ m/min}) \\
&= \boxed{6\text{ m/min}}, \quad \text{since} \\
\frac{\partial v}{\partial t} &= \frac{\partial}{\partial t}\frac{d}{t} = -\frac{d}{t^2} = -\frac{(128\text{ m})}{(8\text{ min})^2}, \quad \text{and} \\
\frac{\partial v}{\partial d} &= \frac{\partial}{\partial d}\frac{d}{t} = +\frac{1}{t} = +\frac{1}{(8\text{ min})}.
\end{aligned}$$

Answer **E**.