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1ª Questão:

$a(v) = 1 + \frac{1}{2}v^2$

$s = 0$

$v = 0$

$a \cdot ds = v\,dv$

$\left(1 + \frac{1}{2}v^2\right) ds = v\,dv$

$$\int_0^s ds = \int_0^v \frac{v \cdot dv}{1 + \frac{1}{2}v^2}$$

$$s = \int_0^v \frac{v \cdot dv}{\frac{2 + v^2}{2}}$$

$u = 2 + v^2$

$du = 2v\,dv$

$dv = \frac{du}{2v}$

$$s = 2\int_0^v \frac{v\,dv}{2 + v^2}$$

$$s = 2\int_0^v \frac{v\,du}{u \cdot 2v}$$

$$s = \int_0^v \frac{du}{u} \Rightarrow s = \ln|u|\Big|_0^v$$

$$s = \ln|2 + v^2|\Big|_0^v$$

$$s = \ln|2 + v^2| - \ln|2|$$

$$s = \ln\left|\frac{2 + v^2}{2}\right|$$

$$e^s = \frac{2 + v^2}{2}$$

$$v^2 = e^s \cdot 2 - 2$$

$$v = \sqrt{2e^s - 2} \Rightarrow \boxed{v = \sqrt{2(e^s - 1)}\ \frac{m}{s}}$$