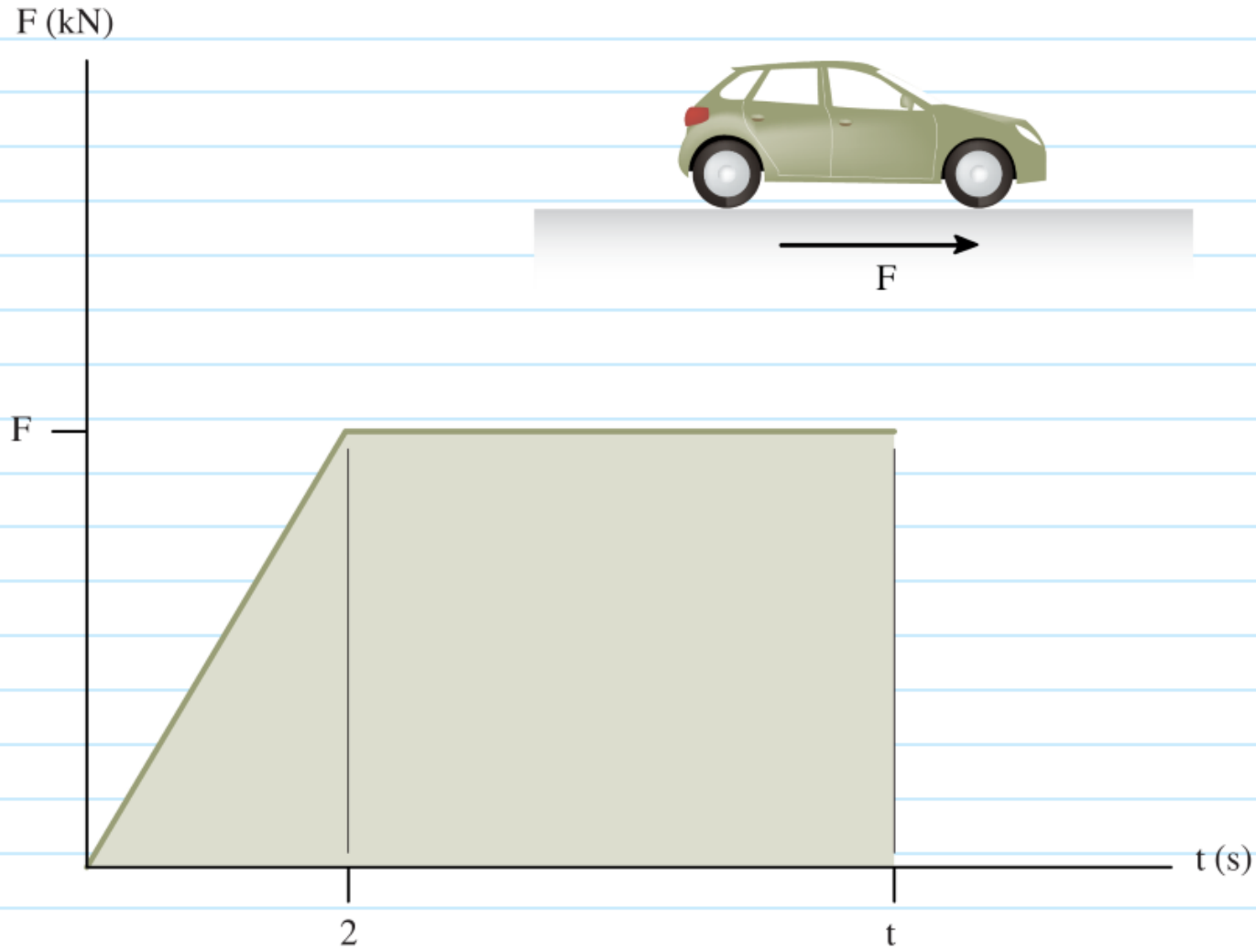
21-P-MOM-GD-002



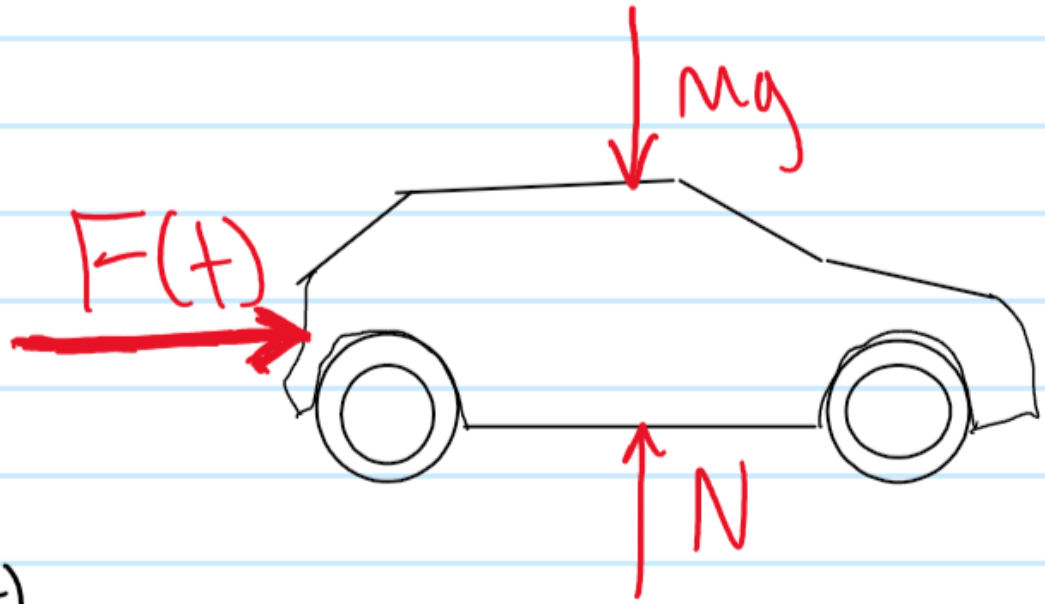
A m kg car's tires provide a variable force as shown in the figure. If the value of F reaches F N, how fast is the car moving at $t = t$ s, if the car starts from rest?

given

m, F, t

find

V_2



Impulse and Momentum

$$mv_1^{0} + \int \Sigma F\,dt = mv_2$$

$$\int_0^2 F\,dt + \int_2^t F\,dt = mv_2$$

$$F \cdot 2\left(\tfrac{1}{2}\right) + F(t-2) = mv_2$$

$$v_2 = \frac{F + F(t-2)}{m}$$