

9. It takes 185 kJ of work to accelerate a car from 23.0 m/s to 28.0 m/s. What is the car's mass?

Work – Energy Theorem

$$\sum W = \Delta K$$

$$W = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_0^2 = \frac{1}{2}m(v_f^2 - v_0^2)$$

Solve for m

$$m = \frac{2W}{v_f^2 - v_0^2} = \frac{2(185 \times 10^3 J)}{(28.0 \text{ m/s})^2 - (23.0 \text{ m/s})^2} = \frac{3.70 \times 10^5 J}{255 \text{ m}^2/\text{s}^2} = 1.451 \times 10^3 \text{ kg}$$

$$\boxed{m = 1450 \text{ kg}}$$

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