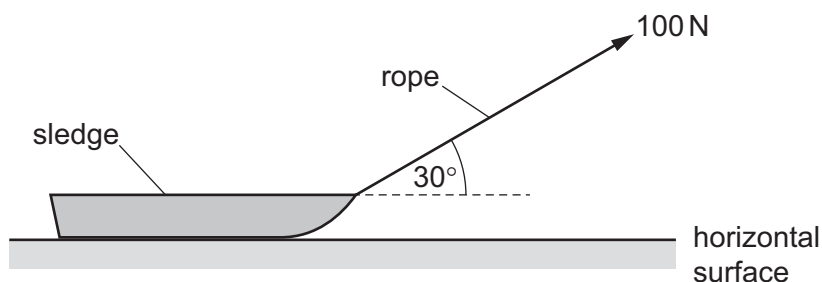


- 17 A rope is attached to a sledge and a boy uses the rope to pull the sledge along a horizontal surface with a constant velocity. The tension in the rope is 100 N and the rope is held at 30° to the horizontal.



How much work does the boy do on the sledge when he pulls it a distance of 5.0 m along the surface?

- A 250 J B 290 J C 430 J D 500 J

- 18 The kinetic energy E_k of an object of mass m moving at speed v is given by the equation shown.

$$E_k = \frac{1}{2}mv^2$$

Which equation is **not** used in the derivation of this equation?

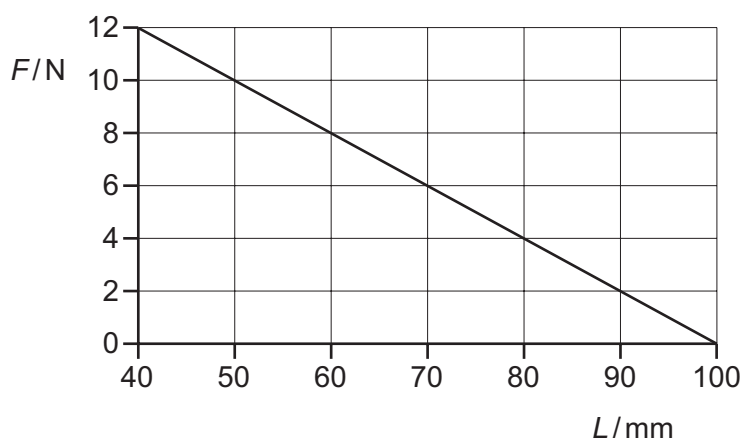
- A $F = ma$ B $s = vt$ C $v^2 = u^2 + 2as$ D $W = Fs$

- 19 A grasshopper of mass 0.12 g jumps vertically. It uses its back legs over a time of 0.020 s to jump, leaving the ground with a velocity of 3.0 m s^{-1} .

What is the average power developed by the legs of the grasshopper?

- A $9.0 \times 10^{-3} \text{ W}$ B $1.8 \times 10^{-2} \text{ W}$ C $2.7 \times 10^{-2} \text{ W}$ D 37 W

- 20 A spring of original length 100 mm is compressed by a force. The graph shows the variation of the compressing force F with the length L of the spring.



What is the energy stored in the spring when the length is 70 mm?

- A 0.090 J B 0.21 J C 0.27 J D 0.63 J