

A force does +180 J of work when it acts on a moving object and its direction is in the same direction as the object's displacement. How much work does this force do when the angle between it and the object's displacement is 56° ?

Solution.

$$W_1 = 180J, \theta = 56^\circ;$$

$$W_2 = ?$$

A force F does of work W_1 when it acts on a moving object and its direction is in the same direction as the object's displacement d :

$$W_1 = Fd.$$

The work W_2 is:

$$W_2 = Fd\cos\theta;$$

θ - the angle between the force vector and the direction of the object's displacement.

By these both equations the work W_2 is:

$$W_2 = W_1\cos\theta.$$

$$W_2 = 180J \cdot \cos 56^\circ \approx 101J.$$

Answer: When the angle between it and the object's displacement is 56° , this force does the work $W_2 = 101J$.