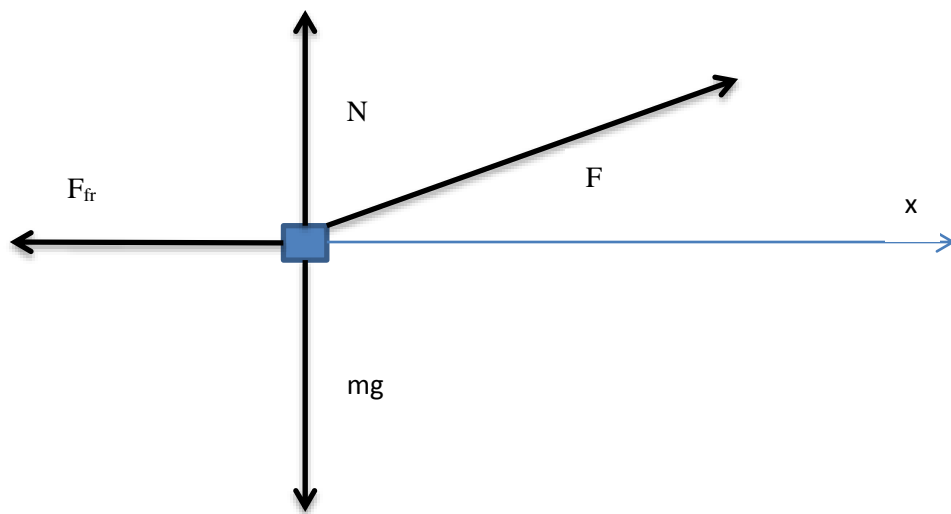


A 255 N force is pulling a 94.6-kg refrigerator across a horizontal surface. The force acts at an angle of 16.7° above the surface. The coefficient of kinetic friction is 0.173, and the refrigerator moves a distance of 5.88 m. Find

- the work done by the pulling force
- the work done by the kinetic frictional force.



F_{fr} – friction force

F – pulling force

- Work can be expressed by the following equation:

$$W = Fd \cos \theta$$

where F is the force, d is the displacement, and the angle θ is defined as the angle between the force and the displacement vector.

Therefore work of pulling force equals:

$$W_p = 255 \text{ N} * 5.88 \text{ m} * \cos 16.7 = 1436 \text{ J}$$

Answer: 1436 J

- Newton's first law of motion on y-axis:

$$F \sin(16.7) + N = mg$$

Therefore, normal force equals:

$$N = mg - F \sin(16.7)$$

Force of friction equals:

$$F_{fr} = \mu N = \mu(mg - F \sin(16.7))$$

work of friction force equals:

$$\begin{aligned} W_f &= F_{fr} d \cos 180 = -0.173 * (94.6 * 9.81 - 255 \sin 16.7) * 5.88 \\ &= -869 J \end{aligned}$$

Answer: $-869 J$