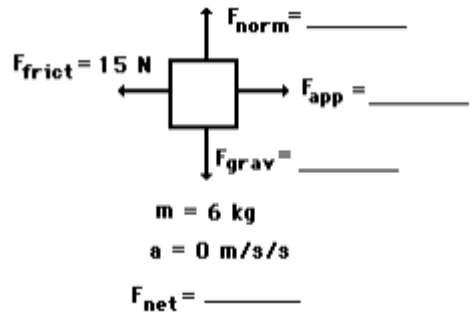
ANSWERS TO PROBLEMS 11, 12 , 14

11. A rightward force is applied to a 6-kg object to move it across a rough surface at constant velocity. The object encounters 15 N of frictional force. Use the diagram to determine the gravitational force, normal force, net force, and applied force. (Neglect air resistance.)



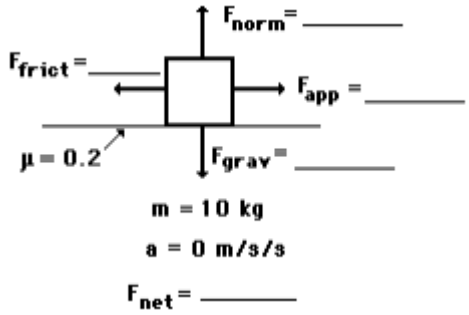
$F_{grav} = m \cdot g = 6\ kg \cdot 9{,}8\ N/kg = 58{,}8\ N$

$F_{norm} = F_{grav} = 58{,}8\ N$

$F_{net} = m \cdot a = 0$ (because $a = 0\ m/s^2$)

$F_{net} = F_{app} - F_{frict} \rightarrow F_{app} = F_{frict} = 15\ N$

12. A rightward force is applied to a 10-kg object to move it across a rough surface at constant velocity. The coefficient of friction between the object and the surface is 0.2. Use the diagram to determine the gravitational force, normal force, applied force, frictional force, and net force. (Neglect air resistance.)



$F_{grav} = m \cdot g = 10\ kg \cdot 9{,}8\ N/kg = 98\ N$

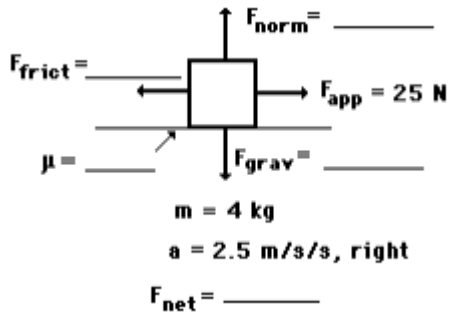
$F_{norm} = F_{grav} = 98\ N$

$F_{frict} = \mu \cdot F_{norm} = 0{,}2 \cdot 98 = 19{,}6\ N$

$F_{net} = m \cdot a = 0$ (because $a = 0\ m/s^2$)

$F_{net} = F_{app} - F_{frict} \rightarrow F_{app} = F_{frict} = 19{,}6\ N$

14. A rightward force of 25 N is applied to a 4-kg object to move it across a rough surface with a rightward acceleration of 2.5 m/s/s. Use the diagram to determine the gravitational force, normal force, frictional force, net force, and the coefficient of friction between the object and the surface. (Neglect air resistance.)



$F_{grav} = m \cdot g = 4\ kg \cdot 9{,}8\ N/kg = 39{,}2\ N$

$F_{norm} = F_{grav} = 39{,}2\ N$

$F_{net} = m \cdot a = 4\ kg \cdot 2{,}5\ m/s^2 = 10\ N$

$F_{net} = F_{app} - F_{frict} \rightarrow F_{frict} = F_{app} - F_{net} = 25 - 10 = 15\ N$

$F_{frict} = \mu \cdot F_{norm} \rightarrow \mu = F_{frict} / F_{norm} = 15 / 39{,}2 = 0{,}38$