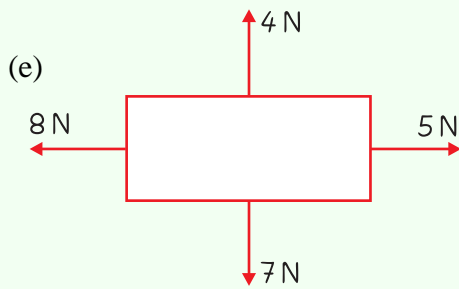
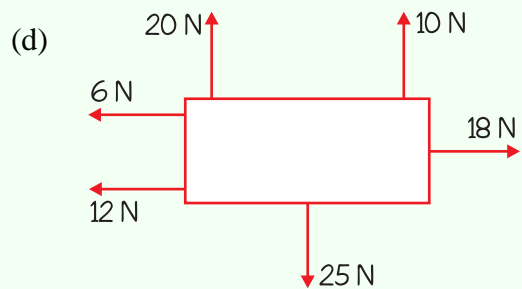
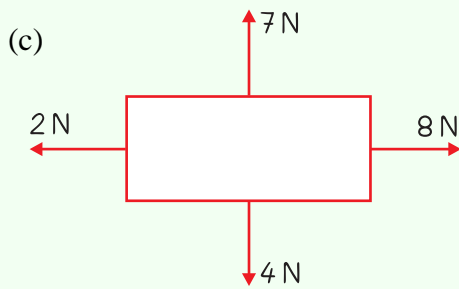
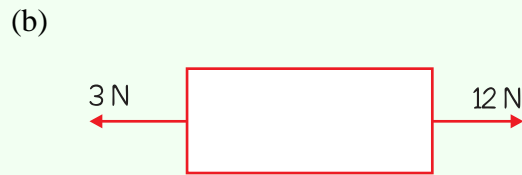
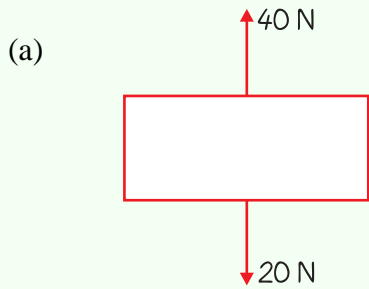
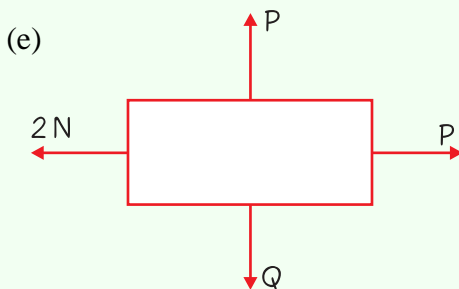
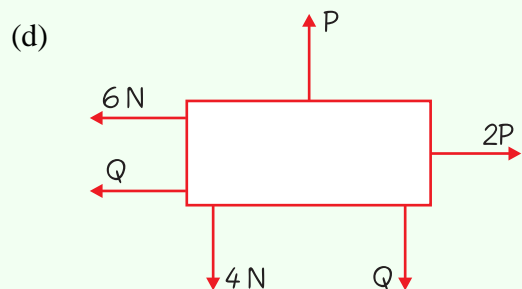
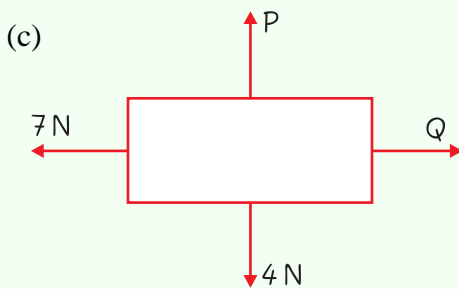
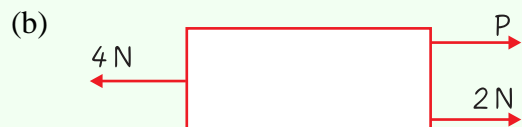
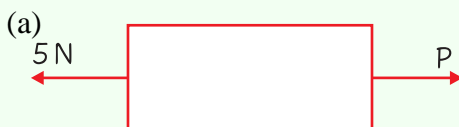


## EXERCISE 1. NET FORCE/ACCELERATION

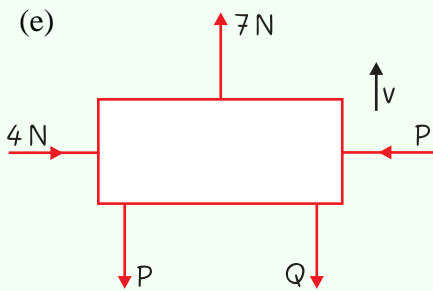
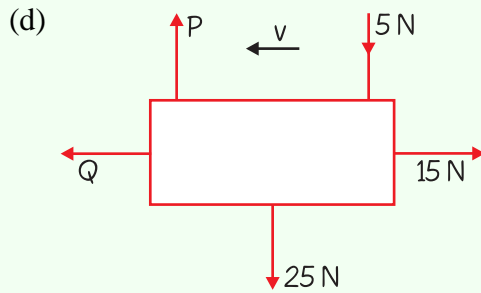
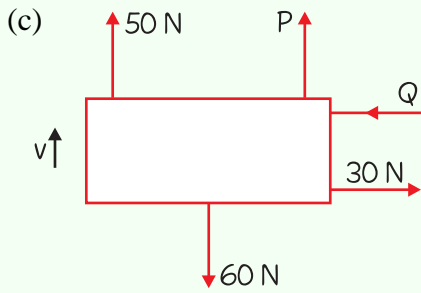
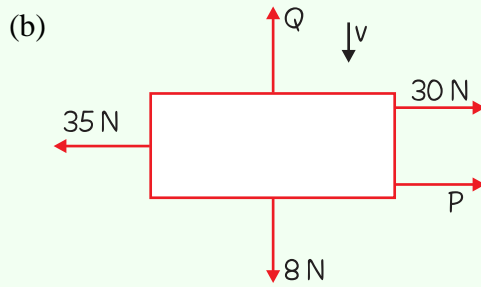
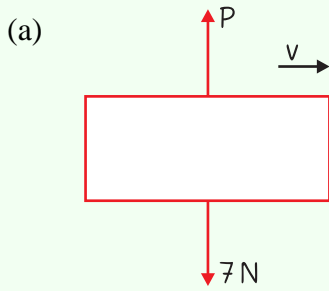
1. Find the net force (i) horizontally, (ii) vertically in size and direction.



2. Find the unknown forces given the body is at rest.



3. Find the unknown forces if the body is moving at a constant velocity  $v$  in the given direction.

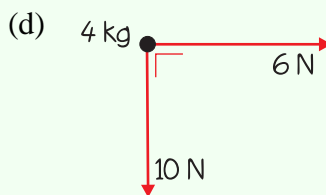
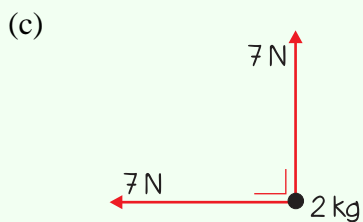
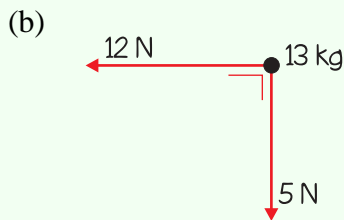
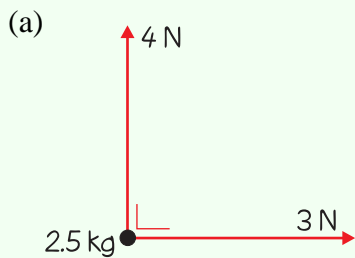


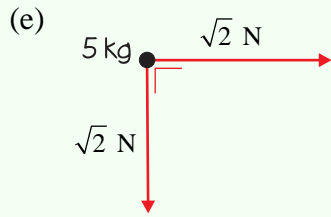
4. Find the acceleration when a body of mass 2 kg experiences a net force of 8 N.

5. Find the net force that would give a 5 kg body an acceleration of  $2 \text{ m s}^{-2}$ .

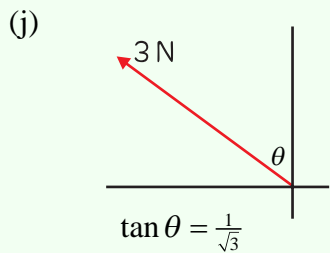
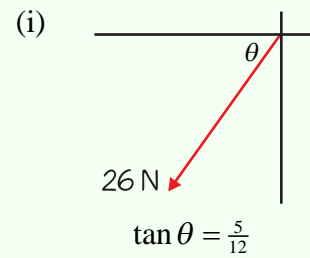
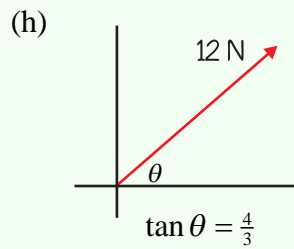
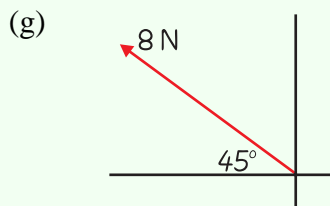
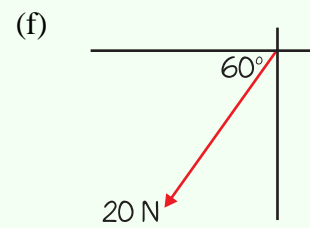
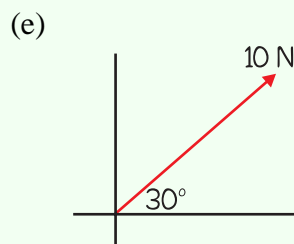
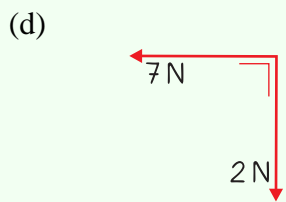
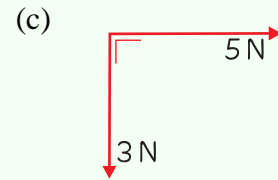
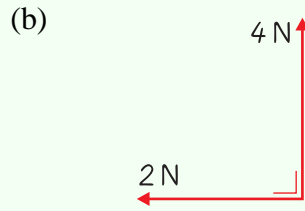
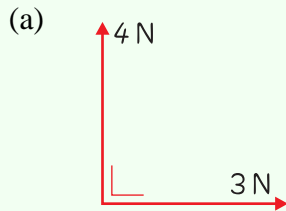
6. A net force of 27 N causes a body to accelerate at  $9 \text{ m s}^{-2}$ . Find its mass.

7. Find the resultant force and the acceleration in size and direction.



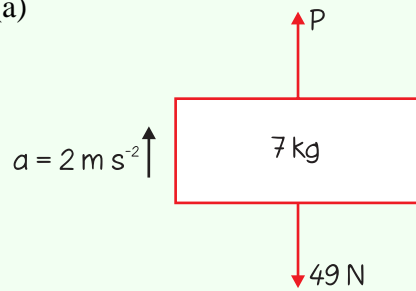


8. Write force  $F$  in  $\vec{i}, \vec{j}$  form.

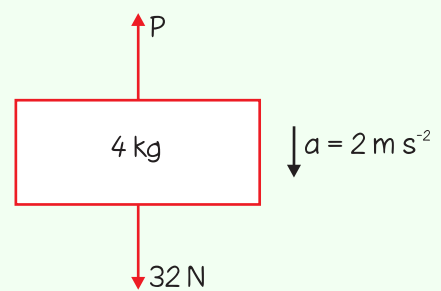


9. In each of the following find the unknown force.

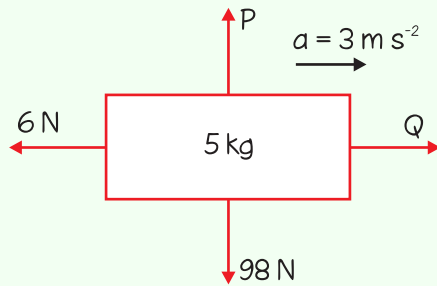
(a)



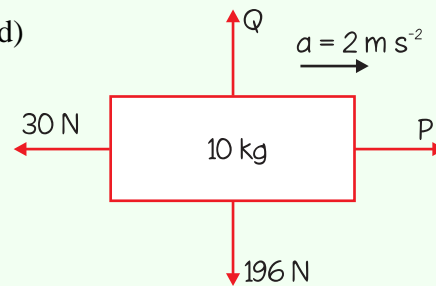
(b)



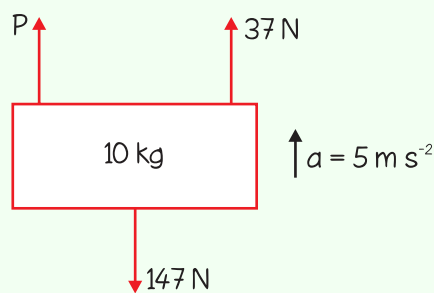
(c)



(d)



(e)



10. (a) A car moves along a level road with constant velocity  $20 \text{ m s}^{-1}$ . If the engine exerts a forward driving force of  $550 \text{ N}$ , what is the resistance force.

(b) A van of mass  $2 \text{ tonnes}$  moves along a level road of resistance  $800 \text{ N}$ . If the engine exerts a driving force of  $1500 \text{ N}$ , find the acceleration of the van.

**ANSWERS**

**EXERCISE 1**

1. (a) 0 N, 20 N up  
 (b) 9 N right, 0 N  
 (c) 6 N right, 3 N up  
 (d) 0 N, 5 N up  
 (e) 3 N left, 3 N down
2. (a)  $P = 5 \text{ N}$   
 (b)  $P = 2 \text{ N}$   
 (c)  $Q = 7 \text{ N}, P = 4 \text{ N}$   
 (d)  $P = 2 \text{ N}, Q = -2 \text{ N}$   
 (e)  $P = 2 \text{ N}, Q = 2 \text{ N}$
3. (a)  $P = 7 \text{ N}$   
 (b)  $Q = 8 \text{ N}, P = 5 \text{ N}$   
 (c)  $Q = 30 \text{ N}, P = 10 \text{ N}$   
 (d)  $Q = 15 \text{ N}, P = 10 \text{ N}$   
 (e)  $P = 4 \text{ N}, Q = 3 \text{ N}$
4.  $4 \text{ m s}^{-2}$
5. 10 N
6. 3 kg
7. (a) 5 N,  $53.13^\circ$  N of E,  $2 \text{ m s}^{-2}$  in the same direction.  
 (b) 13 N,  $22.62^\circ$  S of W,  $1 \text{ m s}^{-2}$  in the same direction.  
 (c)  $7\sqrt{2} \text{ N}$ , NW,  $\frac{7\sqrt{2}}{2} \text{ m s}^{-2}$  in the same direction.  
 (d) 11.66 N,  $59^\circ$  S of E,  $2.9 \text{ m s}^{-2}$  in the same direction.  
 (e) 2 N, SE,  $0.4 \text{ m s}^{-2}$  in the same direction.
8. (a)  $(3\vec{i} + 4\vec{j}) \text{ N}$   
 (b)  $(-2\vec{i} + 4\vec{j}) \text{ N}$   
 (c)  $(5\vec{i} - 3\vec{j}) \text{ N}$   
 (d)  $(-7\vec{i} - 2\vec{j}) \text{ N}$   
 (e)  $(5\sqrt{3}\vec{i} + 5\vec{j}) \text{ N}$   
 (f)  $(-10\vec{i} - 10\sqrt{3}\vec{j}) \text{ N}$   
 (g)  $(-4\sqrt{2}\vec{i} + 4\sqrt{2}\vec{j}) \text{ N}$   
 (h)  $(7.2\vec{i} + 9.6\vec{j}) \text{ N}$   
 (i)  $(-24\vec{i} - 10\vec{j}) \text{ N}$   
 (j)  $(-\frac{3}{2}\vec{i} + \frac{3\sqrt{3}}{2}\vec{j}) \text{ N}$
9. (a) 63 N  
 (b) 24 N  
 (c)  $Q = 21 \text{ N}, P = 98 \text{ N}$   
 (d)  $P = 50 \text{ N}, Q = 196 \text{ N}$   
 (e)  $P = 160 \text{ N}$
10. (a) 550 N  
 (b)  $0.35 \text{ m s}^{-2}$