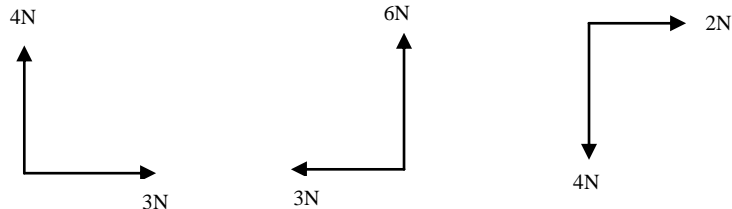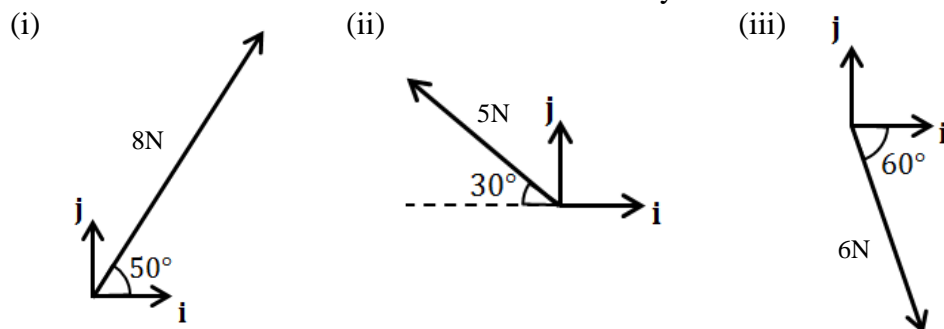## Section 1: Resolving forces
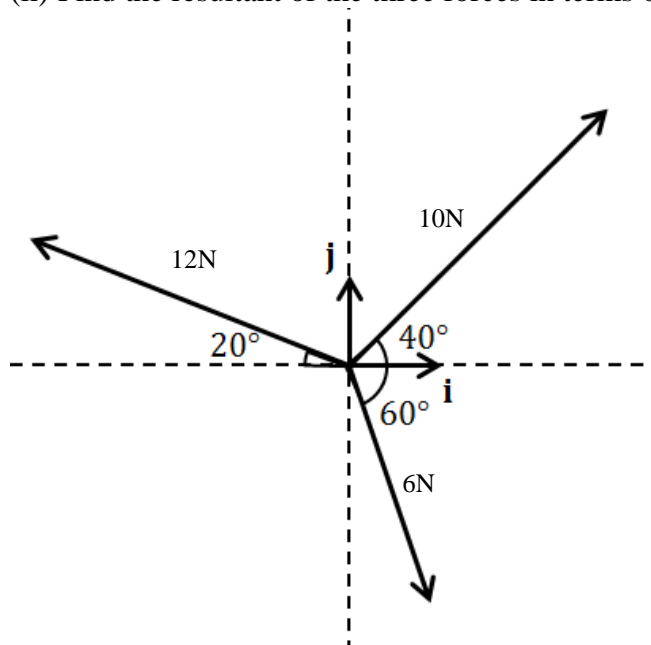
Exercise level 1

1. In each of the following diagrams, two forces are shown.
   Calculate the magnitude of their resultant and the angle it makes with the horizontal.

2. Write down the following forces in component form in terms of **i** and **j** and in column vector form. Work to 3 s.f. where necessary.

   (i)   (ii)   (iii)

3. (i) Write down each of the forces shown in the diagram below in terms of **i** and **j**.
   (ii) Find the resultant of the three forces in terms of **i** and **j**.
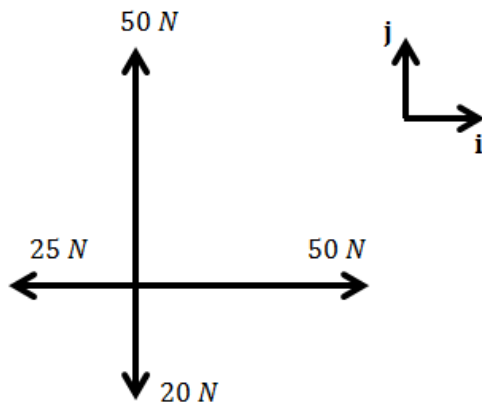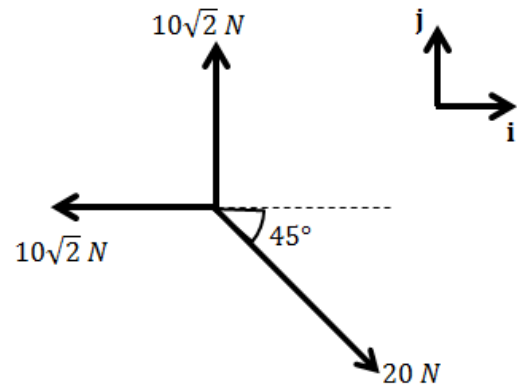
AQA A level Maths Forces in 2D 1 Exercise

4. For each of these situations:
   - (a)   state if the forces are in equilibrium,
   - (b)   find the resultant force in terms of **i** and **j**,
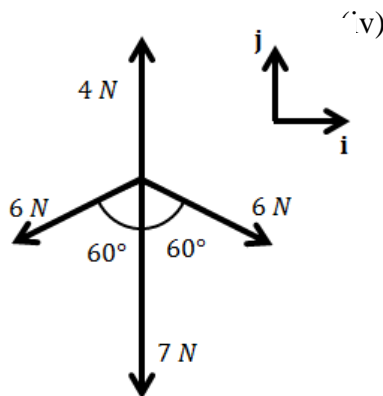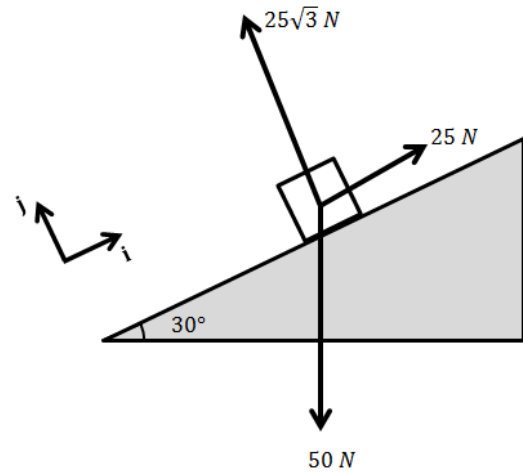   - (c)   find the magnitude of the resultant force.

(i)

50 N
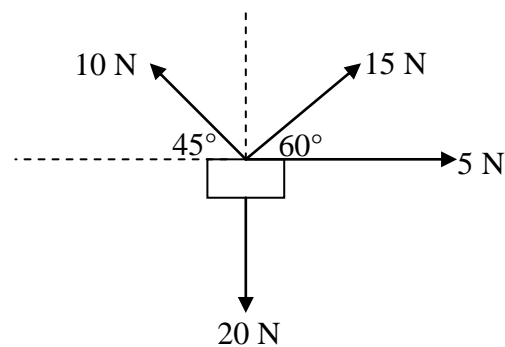
25 N   50 N

20 N

j
i

(ii)

$10\sqrt{2}$ N

$10\sqrt{2}$ N   45°

20 N

j
i

(iii)

4 N

6 N   6 N
60°   60°

7 N

j
i

(v)

$25\sqrt{3}$ N

25 N

30°

50 N

j
i

5. The diagram shows four forces acting on a package. Find the resultant force on the package.

10 N   15 N

45°   60°   5 N

20 N

6. Both diagrams below show a particle in equilibrium under the action of various forces. In each case find the values of the unknown forces and angles.

(i)

P N

30°

X N

10 N

(ii)

8 N

10 N   θ   6 N

W N