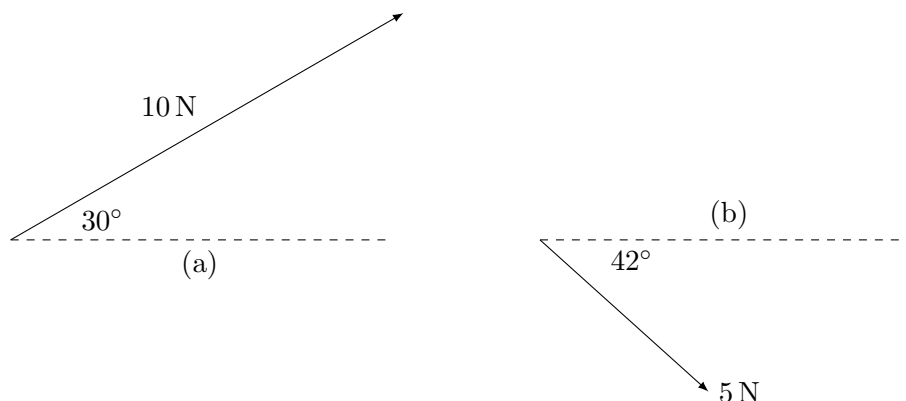


# Resolution of vectors

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It is useful to draw a diagram for these questions. Take  $g = 10 \text{ m s}^{-2}$  where necessary.

1. A force of 50 N acts at  $55^\circ$  up from the horizontal. Calculate its horizontal and vertical components.
2. Calculate the horizontal and vertical components of the following vectors:



3. Raindrops of mass  $5 \times 10^{-7} \text{ kg}$  fall vertically in still air with a speed of  $3.0 \text{ m s}^{-1}$ . In a horizontal wind, they happen to move at an angle of  $33.7^\circ$  from the vertical.
  - (a) What is the wind speed?
  - (b) What is the kinetic energy of a drop falling in such a wind?
4. A girl throws a javelin into the air at an angle of  $38^\circ$  to the horizontal. If the initial horizontal component of the velocity is  $19.7 \text{ m s}^{-1}$ , calculate
  - (a) the initial velocity of the javelin,
  - (b) the initial vertical component of the velocity.
5. A block of mass 1.5 kg is placed on a plane inclined at  $40^\circ$  to the horizontal. Calculate
  - (a) the weight of the block
  - (b) the component of the weight down the plane, and
  - (c) the component of the weight into the plane.
  - (d) Assuming the block is at rest held only by friction, what is the value of the frictional force?



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