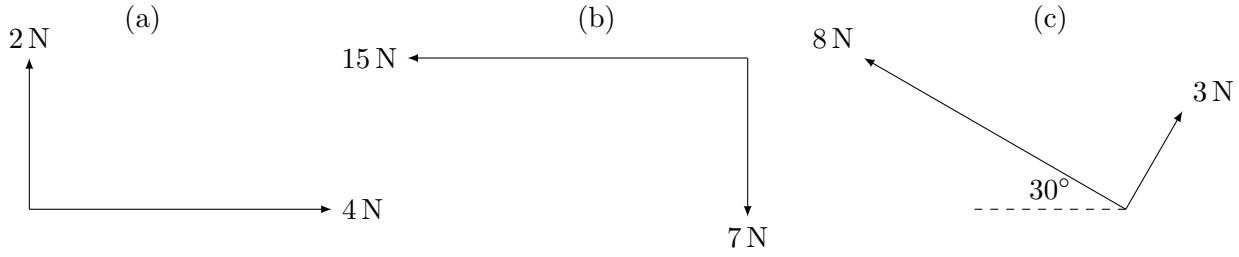
Resultants I

A.C. Norman
anorman@bishopheber.cheshire.sch.uk

1. By calculation, find the resultant magnitude and direction of the following pairs/sets of vectors:
   (a) 7 N at 90° to 24 N,
   (b) 20 N at 90° to 20 N,
   (c) 5 N north and 15 N south,
   (d) 10 N north, 8 N south and 4 N east.
2. By scale drawing, find the resultant magnitudes and directions of the following pairs/sets of forces:
   (a) 5 N east and 10 N north,
   (b) 8 N east and 4 N west.
3. Calculate the resultants of the following pairs of forces, giving the angle of the resultant compared to the horizontal



4. An aircraft is flying at $250\,\mathrm{m\,s^{-1}}$ on a heading due east when it encounters a wind of $50\,\mathrm{m\,s^{-1}}$ blowing from a northerly direction.
   (a) Draw a scale diagram of this,
   (b) calculate (not measure) the resultant velocity of the aircraft,
   (c) calculate the resultant direction of the velocity.
5. Hailstones falling vertically in still air have a constant velocity of $15\,\mathrm{m\,s^{-1}}$. If a gale blows horizontally at $20\,\mathrm{m\,s^{-1}}$, calculate the resultant velocity (magnitude and direction) of the hailstones.
6. A particle is moving due east at $4\,\mathrm{m\,s^{-1}}$ and it changes direction and starts to move due south at $3\,\mathrm{m\,s^{-1}}$. Calculate the change in velocity.