

Question 1 – 18 marks

A plane has an air speed (that is, a speed relative to the surrounding air) of 700 km hr^{-1} and a heading of 140° . There is a wind blowing *from* a bearing of 240° at a speed of 80 km hr^{-1} .

- (a) Using North-South and East-West axes, draw a sketch with arrows showing the direction of the plane (relative to the surrounding air) and the direction of the wind, marking the bearing angles and the angles between the arrows and the North-South (vertical) axis. [3]
- (b) Using the directions and angles identified in the previous part of the question, draw a sketch to show the resultant velocity vector \mathbf{v} of the plane that arises from combining the vector \mathbf{p} for the velocity of the plane (relative to the surrounding air) with the vector \mathbf{w} for the velocity of the wind. Label any known angles in the vector triangle with their size in degrees, showing how you found this. The lengths and angles do not have to be drawn exactly to scale. [5]
- (c) Hence find the magnitude and direction of the resultant velocity \mathbf{v} of the plane, giving the magnitude to the nearest km hr^{-1} and the direction as a bearing to the nearest degree. [10]