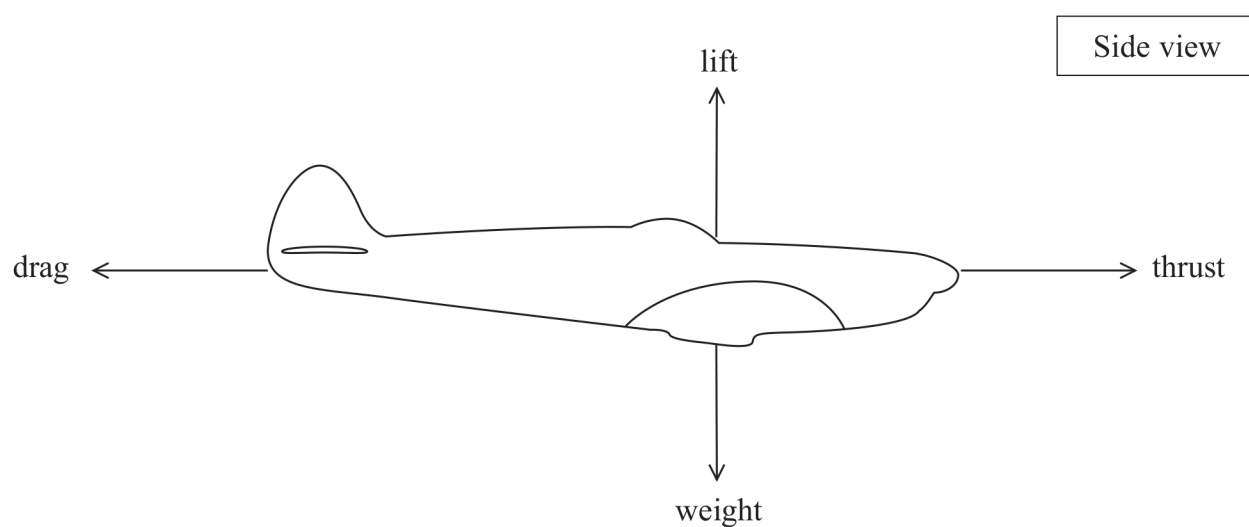


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13 There are four forces acting on an aeroplane in flight, as shown.



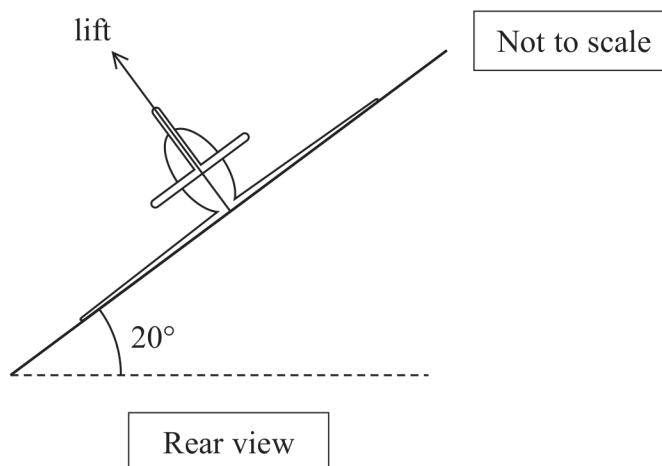
- (a) The lift force is perpendicular to the wings.

To change direction, the aeroplane 'banks' so that one wing is lower than the other wing.

The lift force is then no longer vertical.

The aeroplane flies in a horizontal circular path at a speed of 52 m s^{-1} .

The diagram below shows the aeroplane banking at an angle of 20° to the horizontal.



- (i) Show that the radius of the circular path is about 800 m.

mass of aeroplane = 1200 kg

speed of aeroplane = 54 m s^{-1}

(5)

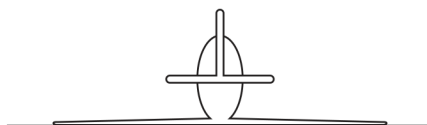
(ii) Determine the time taken by the plane to move through 90° of the circular path.

speed of aeroplane = 54 m s^{-1}

(2)

Time =

- (b) The wings of the aeroplane are now levelled, as shown below.
The speed and the magnitude of the lift force remain the same.



Explain what will happen to the vertical motion of the aeroplane.

(2)