

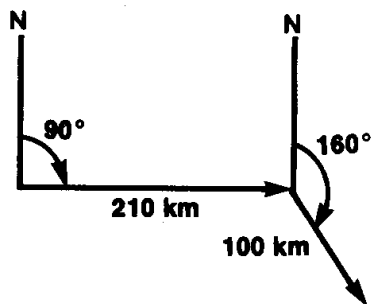
Handout for LessonPlan 15

1)

An airplane flies at an air speed (speed through air) of 425 miles per hour on a heading due south. It flies against a headwind of 110 miles per hour from a direction 30° east of south. Find its ground speed (speed over the ground) and direction as well as its components in westerly and southerly directions.

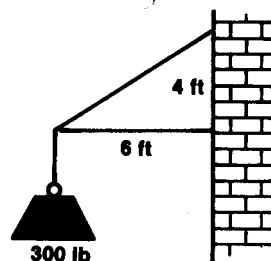
2)

An airplane flies on a heading of 090° for 210 km. It then heads on a course of 160° for 100 km. By resolving this latter vector into easterly and southerly components, determine the location of the plane from its starting place. Give its distance and direction.



3)

A weight hangs on a cable. If the system is in equilibrium, find the horizontal and vertical components acting in the brace to the wall. (Hint: The horizontal and vertical components acting at the vertex where the cable and brace meet have a vector sum of zero.)



4)

A trunk weighing 320 pounds is at rest on a ramp which is inclined at 15° . Three forces act on the trunk. The first is the pull of gravity, \vec{v}_1 . The second, \vec{v}_2 , is the push of the ramp against the trunk, perpendicular to the bottom of the trunk. The third, \vec{v}_3 , is the force of friction parallel to the ramp which keeps the trunk from sliding down the ramp. Find the magnitude of \vec{v}_2 and \vec{v}_3 . (Hint: What is the sum of the vectors acting on the trunk?)

