

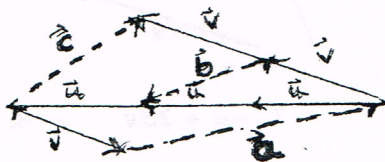
Vectors / Applications

Express each vector in terms of \vec{u} and \vec{v} .

1. \vec{a}

2. \vec{b}

3. \vec{c}



4. Two planes take off from an airfield at P with headings of 40° and 150° from P, respectively, and speeds of 200 km/h and 300 km/h, respectively. How far apart are the planes after 30 min?

5. A plane with a heading of 70° has an air speed of 400 km/h while a 55 km/h wind is blowing from the west. Find the plane's ground speed and true course.

6. A ship leaves port A and sails 150 km with heading 115° to point B. It then changes its heading to 75° and sails 120 km to C. Find its distance and bearing from A.

7. The air speed of a light plane is 200 km/h and its heading is 90° . A 40 km/h wind is blowing with a bearing of 160° .

a. Find the ground speed and the true course of the plane.

8. An airplane leaves an airport at 9:00 p.m. with a heading of 270° and a speed of 610 mi/h. At 10:00 p.m. the pilot changes the heading to 310° . Determine how far the plane is from the airport at 1:00 a.m.

9. Two planes leave an airport at the same time. the heading of the first plane is 350° , and the heading of the second is 49° . If the planes travel at the rate of 420 and 510 mi/h respectively, how far apart are they after 3 h?

10. If forces of 220 and 180 lb. act at an angle of 46° to each other, determine the magnitude of their sum.

11. If forces of 175.6 and 193.8 lb. act on an object with resultant force 347.2 lb., determine the angle that the resultant force makes with the lesser force.

12. Two ships leave a port at the same time. the heading of the first ship is 73° , and the heading of the second is 115° . If the ships travel at the rate of 12 knots (1 knot = 1 nautical mile per hour) and 15 knots, respectively, determine how far apart they are after 2h.