

Vector Addition Analytically 2

Solve the following Problems

1. Two forces that act on a particle are given by $F_1 = 20 \mathbf{i} - 36 \mathbf{j}$, $F_2 = -17 \mathbf{i} + 21 \mathbf{j}$. Find their resultant in analytic form. Also, determine the magnitude of the resultant and its bearing angle.

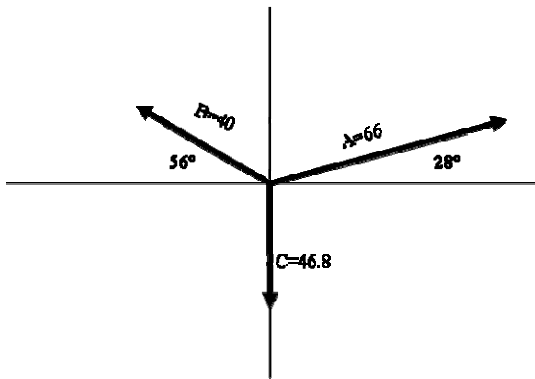
2. 4. A Pocono Mountain Senior, decides to take a week off and visit Pennsylvania colleges. Starting at Mt. Pocono, the student moves the following displacements: He travels 12 miles at an angle of 320° to ESU, 25 miles due south to Lafayette College, 100 miles at 165° to Bucknell University, and finally 80 miles at an angle of 30° to the University of Scranton. Find the resultant displacement from Mt. Pocono. Express this vector in both polar and rectangular notation.

3. 5. A plane is traveling eastward at an airspeed of 500 km/hr. If a 90 km/hr wind is blowing southward, what is the direction and velocity of the plane relative to the ground?

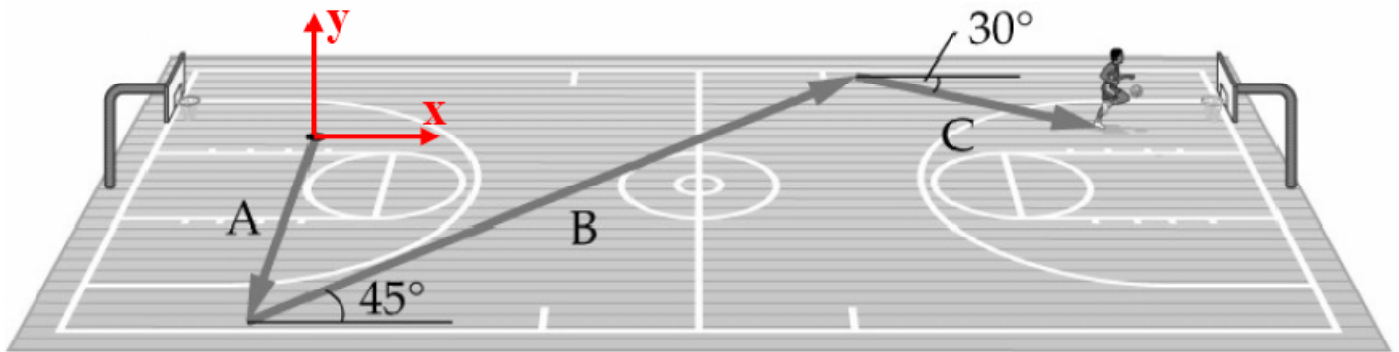
4. SupermanTM flies from the top of a building following a path at an angle of 30° BELOW the horizontal. If the length of Superman'sTM displacement is 100-m (i.e. the R value), then determine both components of this displacement. Express this vector both in polar and rectangular notation.

5. (Holt P.94 #2) Find the magnitude and direction of the resultant velocity vector for the following perpendicular velocities.
- a fish swimming at 3.0 m/s relative to the water across a river that moves at 5.0 m/s
 - a surfer traveling a 1.0 m/s relative to the water across a wave that is traveling a 6.0 m/s

6. (Giancoli p.71 #11) Determine the sum of the following three vectors. Give the resultant in terms of magnitude and direction



7. (Walker p. 74 #20) A basketball player runs down the court, following the path indicated by the vectors A, B, and C in the figure below. The magnitudes of these three vectors are $A = 10.0$ m, $B = 20.0$ m, and $C = 7.0$ m. Find the magnitude and direction of the net displacement of the player.



Name: _____

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Chapter 3: Two Dimensional Motion

8. In your own words, write a clear definition of the resultant of 2 or more vectors. DO NOT tell how to find it, but tell what it represents.
9. How does the resultant vector change as the angle between the two vectors increases to 180° ?
10. Using the analytical method, find the magnitude and direction of the resultant of the following:
- 22 m/s @ 180° ;
 - 28 m/s @ 270° ;
 - 14 m/s @ 45°
11. Using the analytical method, find the magnitude and direction of the resultant of the following:
- 30 m @ 0° ;
 - 15 m @ 30° ;
 - 40 m @ 110°
12. Using the analytical method, find the magnitude and direction of the resultant of the following:
- 53 N @ 18° ;
 - 74 N @ 330° ;
 - 41 m @ 210°