Resultant Vectors

Part I.

Calculate the resultant vectors when the following sets of vectors are combined. Show all steps as directed in class and illustrated by this example.

A = 40 N @ 30° SE A_x = 40 cos 30° = 34.64 A_y = - 40 sin 30° = - 20.00

B = 60 N @ 70° SW B_x = - 60 cos 70° = - 20.52 B_y = - 60 sin 70° = - 56.38

R_x = 14.12 R_y = - 76.38

$R^2 = R_x^2 + R_y^2 = (14.12)^2 + (-76.38)^2 = 6033.28$, so **R** = 77.67 N

$\Theta = \text{Tan}^{-1} \left| (R_y/R_x) \right| = \text{Tan}^{-1} (76.38/14.12) = 79.53°$ SE

Solution: **R** = 77.67 N @ 79.53° SE

Part II.

Using either the "head-to-tail" or "head-to-head" graphical method, construct the resultant vectors when these same sets of vectors are combined. Use a scale of 1.0 cm = 1.0 unit. Measure the magnitude and direction of the resultant and compare with your calculated resultant. Label all vectors as directed in class.

1. ***A*** = 35 N @ 60° NE, **B** = 50 N @ 20° NW

2. ***A*** = 70 m/s @ 60° SW, **B** = 50 m/s @ 70° NW

3. ***A*** = 40 m @ 60° SE, **B** = 80 m @ 30° NW

4. ***A*** = 15 lb @ 60° NE, **B** = 50 lb @ 20° SE

5. ***A*** = 35 N @ 40° SW, B = 65 N @ 20° NW, ***C*** = 65 N @ 20° NE

6. ***A*** = 75 N @ 10° NE, **B** = 50 N @ 20° NW, ***C*** = 65 N @ 70° SE