Name: _____ Phys 12

2.2 Worksheet Vector Addition and Subtraction

You might need to solve some of these on separate sheet of paper

1. Draw these three vectors

A = 5.5 cm [20.0^o] N of E B = 1.8 cm [60.0^o] W of S C = 2.5 cm [36^o] N of W

2. Using trigonometry, find the x and y components of the three vectors (above)

A_x = B_x = C_x =

A_y = B_y = C_y =

3. Find the resulting x component

$R_x = A_x + B_x + C_x$

4. Find the resulting y component

$R_y = A_y + B_y + C_y$

5. Add R_x and R_y vectorally and draw the resultant.

6. Use trig and Pythagoras to find the magnitude and direction of R.

Draw and add the vectors

7. 8 m N & 5 m 30^o N of E

8. 200 m/s 20^o W of S & 15 m/s 20^o W of N

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The Change "Δ" Of A Quantity a.k.a. Vector Subtraction

This deals with the change of a quantity, which can be solved by vector subtraction. We will deal only with $\Delta v = v_f - v_i$ in these questions but the concept will appear several more times in this course. Remember that each term is a vector (therefore, do not expect to simply subtract the values!!)

Solve all problems on your own paper showing all work!

9. If a car that was originally going 40. m/s towards the east took 5.0 s to turn and go 30. m/s towards the south, what is the acceleration of the car?

10. What is the acceleration of a car that changes from 60. m/s to the north to 60. m/s to an angle of 45° East of North in a time of 3.0 s?

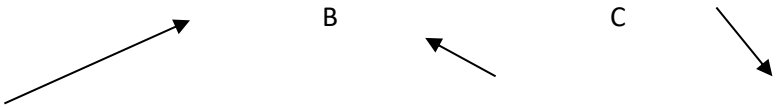
11. What is the acceleration of a bullet that was shot at 40. m/s in the horizontal and then changed to a velocity of 44.5 m/s at 26.1° below the horizontal in a time of 2.0 seconds?

12. What is the acceleration of a ball that bounces off a wall in 0.30 s if its incoming velocity is 60. m/s and its recoil velocity is 50. m/s?

13. A car is traveling at 100 km/h, due northwest. The driver puts on the brakes and turns the corner. Four seconds later, he is heading east at 50 km/h. What is the average acceleration?

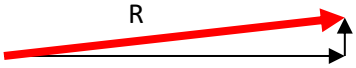
KEY Vector Addition by Components

1) A B C



2) Ax = 5.17 cm; Ay = 1.88 cm; Bx = -1.69 cm; By = 0.62 cm; Cx = 1.05 cm; -2

3) 4.53 cm 4) 0.5 cm 5) R



6) R = 4.6 cm θ = 6.0°

Draw and Add Vectors

7) 11.3 m 22° E of N 8) 188 m/s 23° W of S

Change in Quantity

9) 10 m/s^2 53° E of S 10) 15 m/s^2 68° E of S 11) 9.8 m/s^2 down 12) 367m/s^2 back

13) 9.7 m/s^2 30° S of E