

Phys12 Vectors : Quiz - 30

1)a) Define : Vector -

b) Give three examples of quantities that are vectors.

2)a) Define : Scalar -

b) Give three examples of quantities that are scalars.

3)a) Find the resultant displacement, given the three displacement vectors : 30.m East + 10.m West + 20.m East

b) Find the resultant displacement, given the four displacement vectors : 10.km West + 4.0km North + 7.0km East + 9.0km South. (Write your answer as a magnitude and a direction relative to the x-axis.)

c) Find the resultant. Write your answer as an ordered pair.
 $[7.0, -3.0] + [-5.0, 11.0] + [-3.0, -4.0] =$

d) Write your answer to c) above as a magnitude and a direction relative to the x-axis.

e) Find the resultant. 35 [N] + 40. [30.° W of N] + 55 [45° S of E]
Write your answer as a magnitude and a direction relative to the x-axis.

4) A ball is at equilibrium. Two forces (in Newtons) acting on the ball are : $[7.0, -4.0]$, and $[-12.0, 8.0]$. Find the third force.

5) Given that $\mathbf{A} = [-2.0, 4.0]$ and $\mathbf{B} = [3.0, -1.0]$

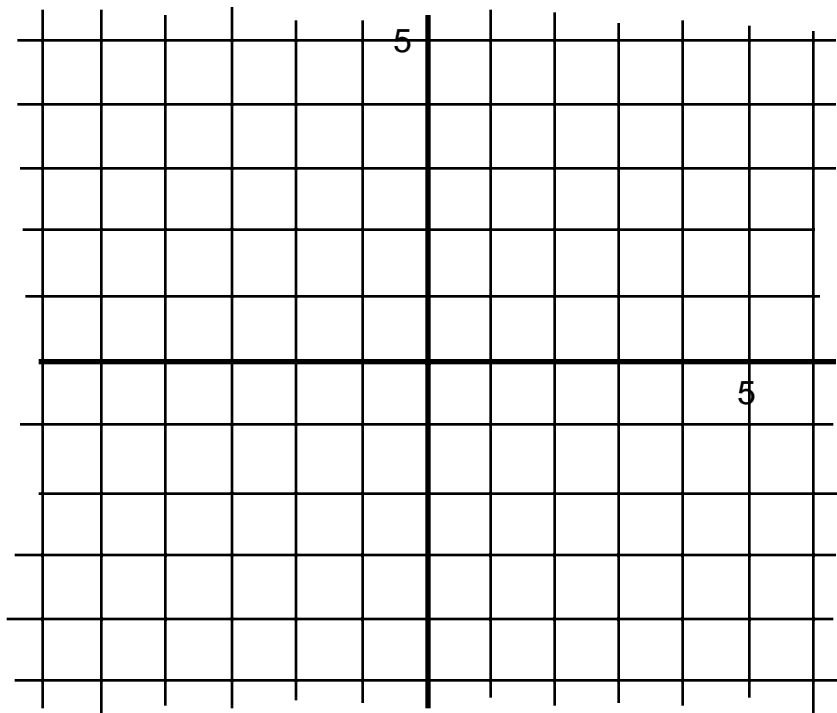
a) Find $\mathbf{A} + \mathbf{B} =$

b) Find $\mathbf{A} - \mathbf{B} =$

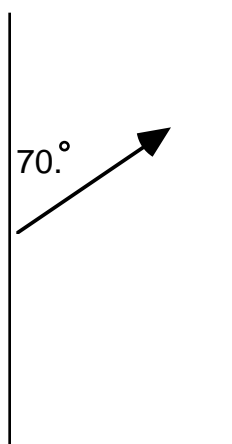
c) Find $2\mathbf{A} - \mathbf{B} =$

d) Find \mathbf{C} if $\mathbf{A} + \mathbf{B} + \mathbf{C} = [0.0, 0.0]$, : $\mathbf{C} =$

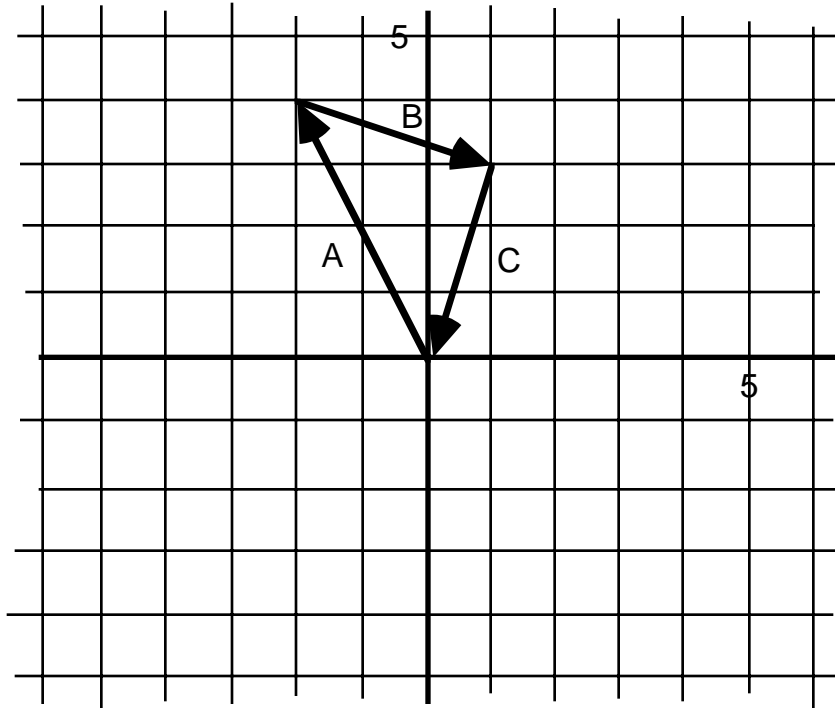
e) Graph $\mathbf{A} + \mathbf{B} + \mathbf{C}$ on the grid below.(use a ruler)



- 6) A truck heads West at 15. km/hr. A man on the truck walks south on the truck at 5.0 km/hr. Find the velocity of the man relative to the ground.
- 7) The heading of a plane (according to the compass) is 45° [W of N], and the airspeed (speed relative to the air) is 120 km/hr. The windspeed is 20. km/hr [South]. Find the speed and direction relative to the ground.
- 8) How many seconds will it take for the boat to make it across the canal ? The water velocity in the canal is approximately zero. The boat velocity is 5.0 m/s in the direction given and the width of the canal is 350. m.



Answers : 1)a) It is a magnitude and a direction. b) force, velocity, displacement. 2)a) It is a magnitude. b) mass, time, distance, 3)a) 40.m [East] b) $[-3.0, -5.0] = 5.8\text{km [}59^\circ \text{ S of W]}$ c) $[-1.0, 4.0]$, d) 4.1 $[76^\circ \text{ N of W]}$ e) $[0, 35]+[-20., 35] + [39, -39] = [19, 31] = 36 [58^\circ \text{ N of E}]$, 4) $[5.0, -4.0]$, 5)a) $[1.0, 3.0]$, b) $[-5.0, 5.0]$, c) $[-7.0, 9.0]$, d) $[-1.0, -3.0]$, e)



6) 15.8 km/hr $[18^\circ \text{ S of W}]$, 7) $[0., -20.] + [-85, 85] = [-85, 65] = 110 \text{ km/hr } [37^\circ \text{ N of W}]$, 8) $350./\{5.0\cos 20.\} = 74 \text{ s.}$