Questions:

1- The magnitudes of two vectors A and B are A = 5 units and B = 2 units. Find the largest and smallest values possible for the magnitude of the resultant vector R = A + B.

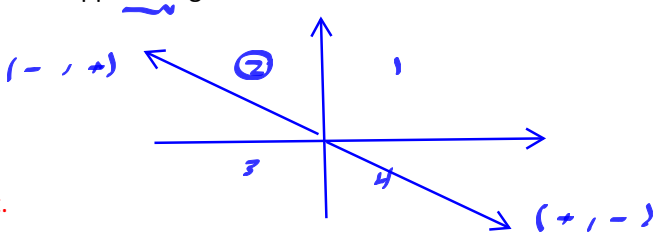
(a) 3 and 5
(b) 2 and 6
(c) 7 and 3
(d) 5 and 2
(e) 8 and 3

2- Which of the following are vectors and which are not:

(a) Force
(b) Temperature
(c) The volume of water in a can
(d) The ratings of a TV show
(e) The height of a building
(f) The velocity of a sports car
(g) The age of the Universe

3- A vector lying in the *xy* plane has components of opposite sign. The vector must lie in which quadrant?

(a) the first quadrant
(b) the second quadrant
(c) the third quadrant
(d) the fourth quadrant
(e) either the second or the fourth quadrant.



4- Vector A lies in the xy plane. Both of its components will be negative if it points from the origin into which quadrant?

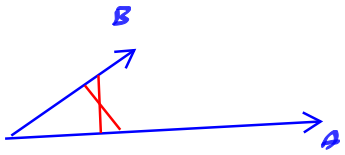
(a) the first quadrant
(b) the second quadrant
(c) the third quadrant
(d) the fourth quadrant
(e) the second or fourth quadrants

5- The magnitude of vector A is 8 km, and the magnitude of B is 6 km. Which of the following are possible values for the magnitude of A + B? Choose all possible answers.

(a) 10 km
(b) 8 km
(c) 0 km
(d) 2 km
(e) -2 km

6- If A = B, what can you conclude about the components of A and B?

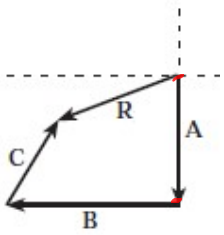
(a) They have the same magnitude and same direction
(b) They have the same magnitude and opposite direction
(c) They have different magnitude and same direction
(d) They have different magnitude and opposite direction
(e) none of those answers.



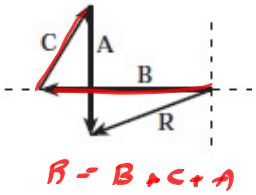
7- If the component of vector A along the direction of vector B is zero, what can you conclude about the two vectors?

(a) They have the same magnitude and same direction
(b) They have the same magnitude and opposite direction
(c) They have different magnitude and same direction
(d) They have different magnitude and opposite direction
(e) none of those answers.

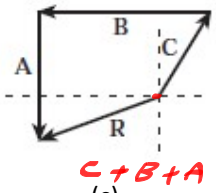
8- Three displacements are A = 200 m, due south; B = 250 m, due west; C = 150 m, 30.0° east of north. Which of the following diagram represent the adding R = A + B + C



(a)

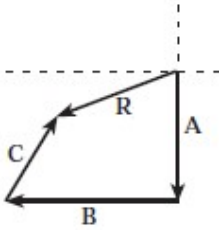


R = B + C + A
(b)

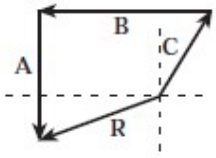


C + B + A
(c)

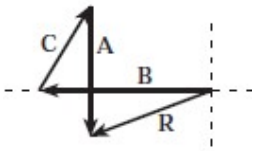
9- Three displacements are A = 200 m, due south; B = 250 m, due west; C = 150 m, 30.0° east of north. Which of the following diagram represent the adding R = B + C + A



(a)

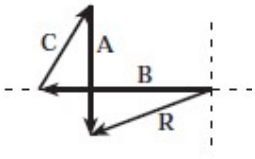


(b)

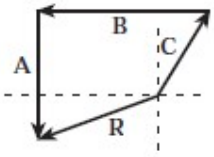


(c)

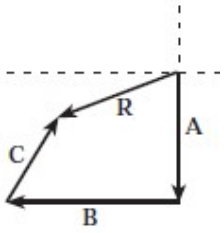
10- Three displacements are A = 200 m, due south; B = 250 m, due west; C = 150 m, 30.0° east of north. Which of the following diagram represent the adding R = C + B + A



(a)



(b)



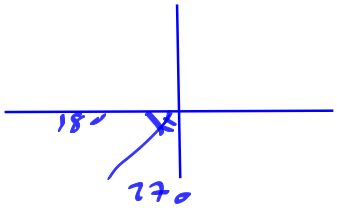
(c)

11- The polar coordinates of a point are r = 5.50 m and θ = 240°. What are the Cartesian coordinates of this point?

(a) x = 60.5m, y = 78 m
(b) x = -8.9 m, y = 9.6 m
(c) x = -2.75 m, y = -4.76 m
(d) x = 2.34 m, y = 7.98 m
(e) x = 0 m, y = 0 m

$x = r\cos\theta = -2.75$

$y = r\sin\theta = -4.76$



12- The Cartesian coordinates of a point are given by (2, y), and its polar coordinates are (r, 30°). Determine the value of y and the value of r.

(a) y = 1.15, r = 2.31
(b) y = 2, r = 0
(c) y = -2.5, r = 1.7
(d) y = -3.8, r = -3.1
(e) y = 1.21, r = -2.1

$x = r\cos\theta$ | $y = r\sin\theta$

$2 = r\cos 30$ | $2.31 \sin 30$

$r = \frac{2}{\cos 30} = 2.31$

13- A point in the xy plane has Cartesian coordinates (2.00, -4.00) m. Determine the polar coordinates?

(a) r = 5.5, $\theta = -60.4^0$
(b) r = 4.4, $\theta = -63.4^0$
(c) r = 2.6, $\theta = 30^0$
(d) r = 3.1, $\theta = 45^0$
(e) r = 1.9, $\theta = -70.3^0$

$r = \sqrt{x^2+y^2} = \sqrt{2^2+4^2} = 4.4$

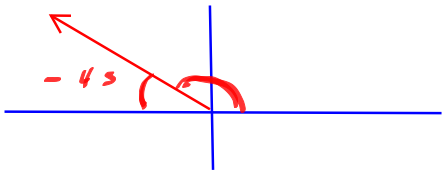
$\theta = \tan^{-1}\left(\frac{y}{x}\right) = \tan^{-1}\left(\frac{-4}{2}\right) = -63.4$

14- A point in the xy plane has Cartesian coordinates (-3.00, 3.00) m. Determine the polar coordinates?

(a) r = 4.2, $\theta = 60^0$
(b) r = 4.4, $\theta = -63.4^0$
(c) r = 4.2, $\theta = -45^0$
(d) r = 3.1, $\theta = 45^0$
(e) r = 1.9, $\theta = -70.3^0$

$r = \sqrt{(-3)^2+3^2} = 4.2$, $\theta = \tan^{-1}(-1) = -45$

135



15- A point in a plane have polar coordinates (2.50 m, 30.0°). Determine the Cartesian coordinates?

(a) (2.17, 1.25) m
(b) (4.10, 3.25) m
(c) (1.8, 1.95) m
(d) (0.77, 1.05) m
(e) (2.00, 3.00) m

$x = 2.5\cos 30$

$y = 2.5 \sin 30$

16- The vector **A** has an x component of A_x = - 25.0 units and a y component of A_y = 40.0 units. Find the magnitude and direction of this vector.

(a) A = 50 units, $\theta = 60.4^0$
(b) A = 47.2 units, $\theta = -58.0^0$
(c) A = 26.9, $\theta = 30^0$
(d) A = 30.1, $\theta = 95^0$
(e) A = 1.9, $\theta = -70.3^0$

$r = \sqrt{25^2+40^2}$

$\theta = \tan^{-1}\left(\frac{40}{-25}\right)$

17- Vector A has a magnitude of 35.0 units and points in the direction 325° counterclockwise from the positive x axis. Calculate the x and y components of this vector.

(a) x = 60.5m, y = 78 m
(b) x = 28.6 m, y = -20m
(c) x = -2.75 m, y = -4.76 m
(d) x = 2.34 m, y = 7.98 m
(e) x = 0 m, y = 0 m

$r = 35$, $\theta = 325$

$x = r\cos\theta$

$y = r\sin\theta$

18- What is the *y* component of the vector $(10\hat{\imath} - 10\hat{k})$m/s?

(a) 10 m/s
(b) -10 m/s
(c) 0 m/s
(d) 10
(e) none of those answers

19- A particle undergoes two consecutive displacements $\vec{A} = (20\vec{\imath} - 10\vec{\jmath})cm$, $\vec{B} = (-10\vec{\imath} + 10\vec{\jmath})cm$, the magnitude of the resultant displacement is:

(a) 0 cm
(b) 10 cm
(c) – 10 cm
(d) 5 cm
(e) 25 cm

20- A particle undergoes three consecutive displacements $\vec{r_1} = (10\vec{\imath} - 10\vec{\jmath} + 18\vec{k})cm$, $\vec{r_2} = (23\vec{\imath} + 15\vec{\jmath} - 12\vec{k})cm$, $\vec{r_3} = (-13\vec{\imath} + 15\vec{\jmath} - 26\vec{k})cm$, the magnitude of the resultant displacement is:

(a) 34.6 cm
(b) 20 cm
(c) – 20 cm
(d) 10 cm
(e) 55.8 cm