18. Find the horizontal and vertical displacement for each of the following vectors (find the angle relative to east within the quadrant)

A. 230 m at 50 degrees (Find A_x and A_y)

$A \quad \Theta$

$A_x = A\cos\Theta$
$A_x = 230m \cos 50°$
$= 147.8m$

$A_y = A\sin\Theta$
$A_y = 230m \sin 50°$
$= 176.2m$

B. 115m at 30 degrees south of west (Find B_x and B_y)

$B \quad \Theta$

$B_x = B\cos\Theta$
$B_x = 115m \cos 30°$
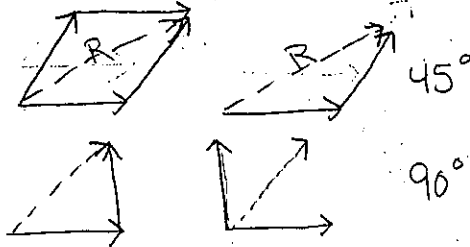$B_x = 99.6m$

$B_y = B\sin\Theta$
$B_y = 115m \sin 30°$
$B_y = 57.5m$

19. As the angle between two concurrent displacements increases from 45° to 90°, the magnitude of their resultant

(A) decreases
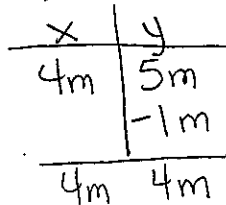B) increases
C) remains the same

$45°$

$90°$

20. A child walks 5.0 meters north, then 4.0 meters east, and finally 1.0 meters south. What is the direction of the resultant displacement of the child after the entire walk?
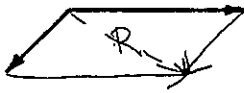
A) 10 degrees
(B) 45 degrees
C) 53 degrees
D) 67 degree

x	y
4m	5m
	-1m
4m	4m

$\Theta = \tan^{-1}\left(\frac{4m}{4m}\right) = 45°$

21. The diagram below represents two concurrent displacements acting on a point. Which vector best represents their resultant?

A)

B)

C)

D)

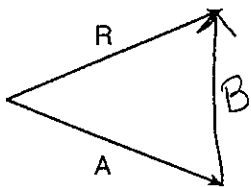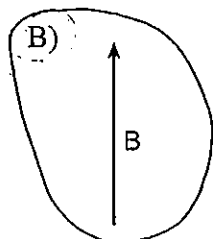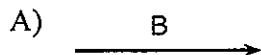22. Displacements A and B have a resultant R. Displacement A and resultant R are represented in the diagram below.

R

B

A

Which vector best represents displacement B?

A)
   B

B)
   B

C)
   B

D)
   B

Topic 1B: Intro to Vectors and 1D Motion

23. A 20 m displacement due north and a 20m displacement due east are experienced by an object, as shown in the diagram below.

North

20.m

East

20 m

R must be less than sum and greater than largest side

What is the magnitude of the resultant displacement?

A) 20m, northeast
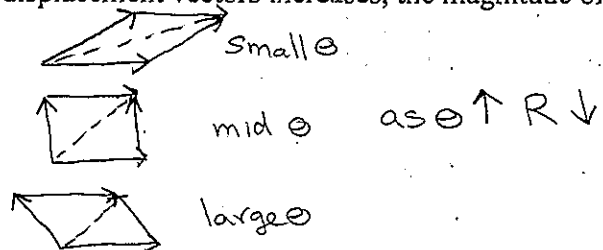B) 20m, southwest
C) 28m, northeast
D) 28m, southwest

$$R^2 = 20m^2 + 20m^2$$
$$R = \sqrt{400m^2 + 400m^2}$$
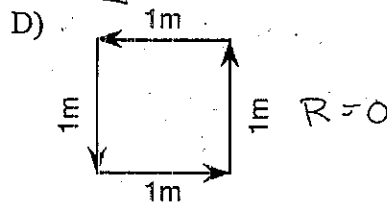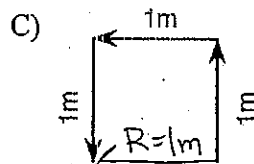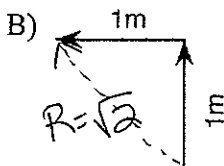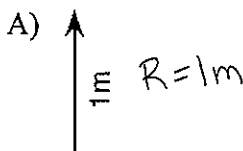$$= 28m$$

24. As the angle between two displacement vectors increases, the magnitude of the resultant displacement

A) decreases
B) increases
C) remains the same

Small θ

mid θ

large θ

as θ ↑ R ↓

25. Which vector diagram represents the greatest magnitude of displacement for an object?

A)
1m $R = 1m$

B)
1m

$R = \sqrt{2}$ 1m

C)
1m
1m $R = 1m$ 1m

D)
1m
1m   1m $R = 0$
1m

26. A person walks 5.0 kilometers north, then 5.0 kilometers east. His displacement is closest to

A) 7.1 kilometers northeast
B) 7.1 kilometers northwest
C) 10 kilometers northeast
D) 10 kilometers northwest

7.1 5km
5km
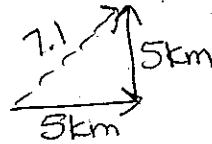
R greater than longest side
less than sum of sides