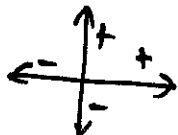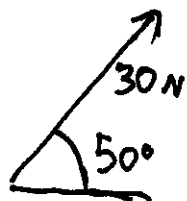Vector Form conversions Ⓐ

For problems 1-6,

   Determine the <u>components</u> of each vector.
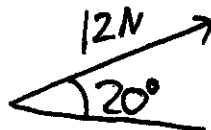   Use the following sign convention:

① 
30N
50°

② 
12N
20°

③ 
15°  50N

⑤④ 
40°
80N

⑤ 
19N 15°

⑥ 
30°
100N
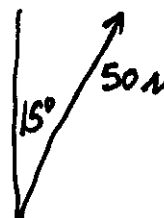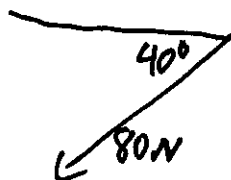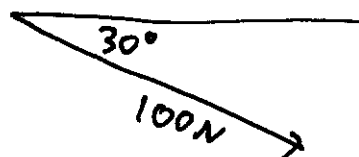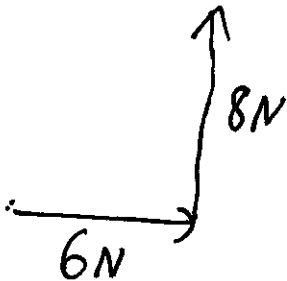
For Problems 7-10,

Write the vector in terms of
magnitude and direction.

⑦

8N

6N

⑧

10 N

3N

⑨

48N

12N

⑩

16N

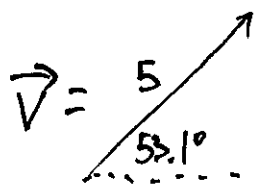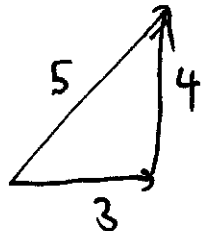40N

Notation of component a form:

$\vec{V} = \dfrac{5}{53.1°}$ ⟹ (triangle with sides 5, 4, 3)
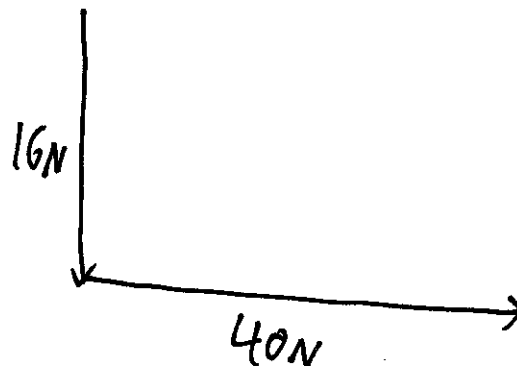
This vector $\vec{V}$ has a x-component of +3 and a y-component of +4.

per

How do you write this? There are several options!

- Angle brackets: $\vec{V} = \langle +3, +4 \rangle$

- Matrix Notation: $\vec{V} = [3, 4]$ or $\begin{bmatrix} 3 \\ 4 \end{bmatrix}$

- Unit vector notation: $\vec{V} = 3\hat{\imath} + 4\hat{\jmath}$

The x-component appears in front of $\hat{\imath}$ and the y-component appears in front of $\hat{\jmath}$.

- Ordered-pair notation $\vec{V} = (3, 4)$

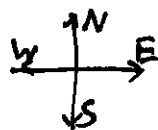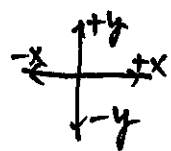- Javascript Object Notation $\vec{V} = \{ "x": 3, "y": 4 \}$

Of these, in physics, the most commonly used is unit vector notation.

Therefore, write your answer that way $\boxed{\vec{V} = 3\hat{\imath} + 4\hat{\jmath}}$

# Notation for Magnitude - Direction form of a vector!

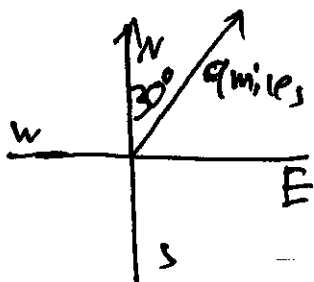- If the vector ~~is~~ ~~kind~~ lines up with an axis ~~a~~ or compass direction, ~~we~~ then write it:



$5 \text{ miles}$ = 5 miles east

$\uparrow 6$ = 6 in the +y direction     $\overset{8}{\leftarrow}$ = 8 in the -x direction

- If not, we use the following terminology!



= 9 miles at $30°$ east of north
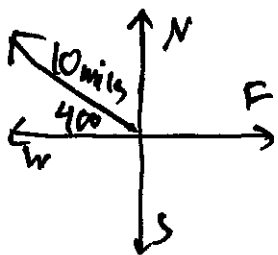


= 10 miles at $40°$ north of west

Note that ~~of miles~~

9 miles at 30° east of north = 9 miles at 60° north of east

10 miles at 40° north of west = 10 miles at 50° west of north
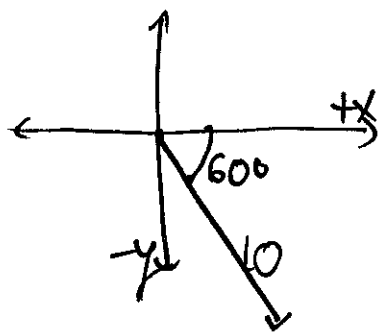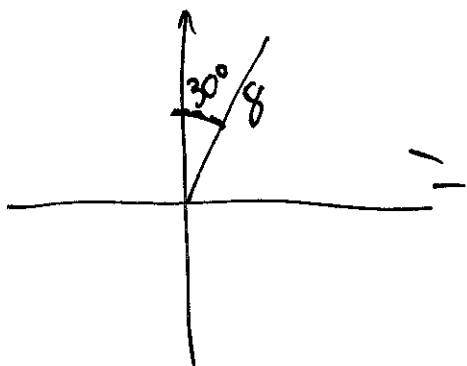
= 10 at 60° down from +x axis

= 10 at 30° right of -y axis
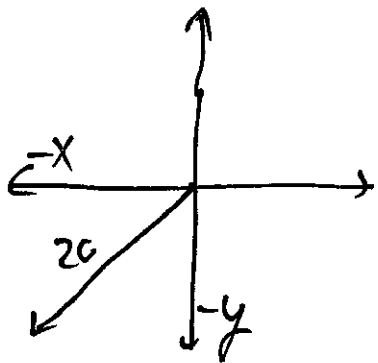
= 20 at 45° down from -x axis
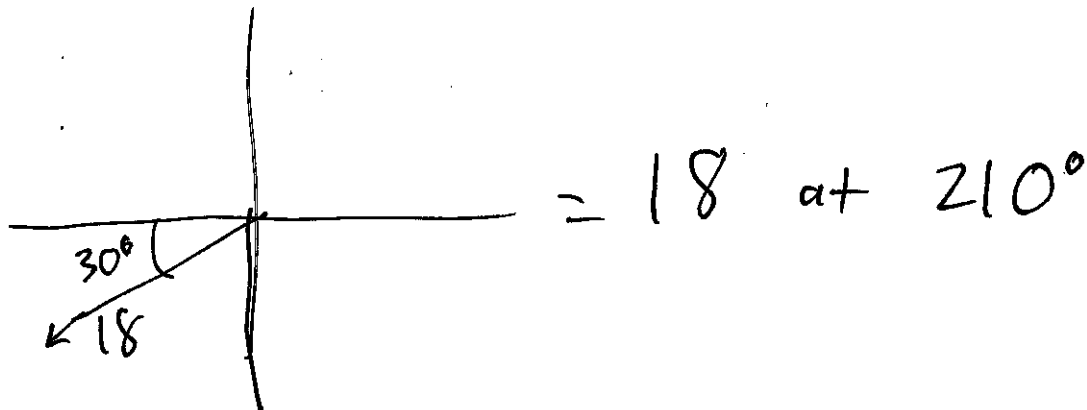
= 20 at 45° left of -y axis

## Polar coordinate form:

In polar coordinate form, ya give the __magnitude__ and give the direction as a angle from 0 to 360°, in which 0 is the +x axis and you proceed clockwise
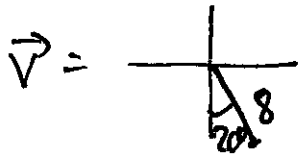
[as in the unit circle in math class.]

= 8 at 60°

$$= 18 \text{ at } 210°$$

Notation for polar coordinates:

$$\vec{V} = \quad \text{[diagram: axes with vector at } 200°, \text{ magnitude } 8]$$

- writing it $\quad \vec{V} = 8 \text{ at } 290°$

- ordered pair form $\quad \vec{V} = (8, 290°)$

- explicitly writing ~~equatio~~ values:

$$\vec{V} : \quad r = 8 \qquad \theta = 290°$$

- Javascript Object Notation:

$$\vec{V} = \{"r": 8,$$
$$\qquad "theta": 290\}$$