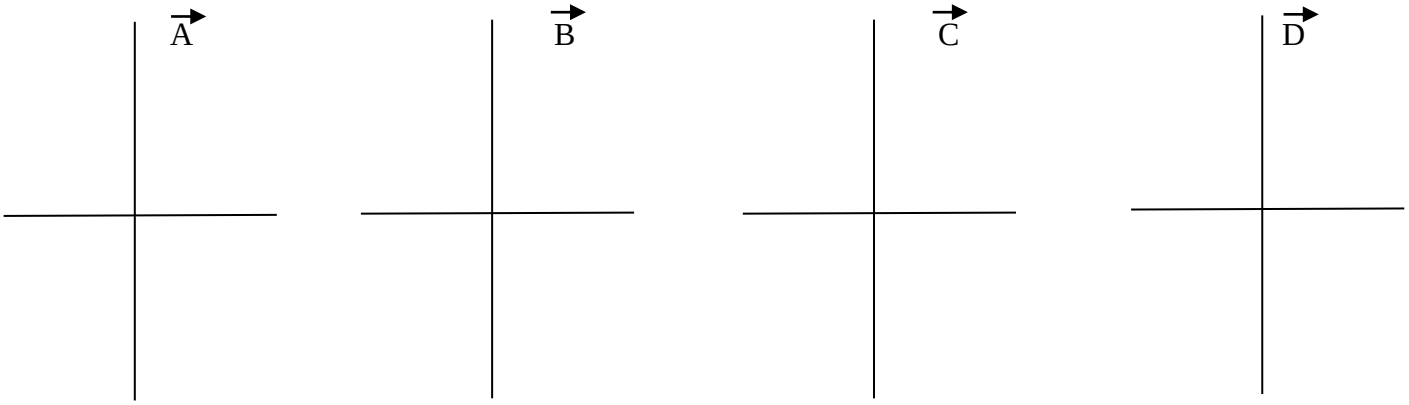
Name: _____
Date: _____ Per ____

Vector Addition Worksheet III / 39

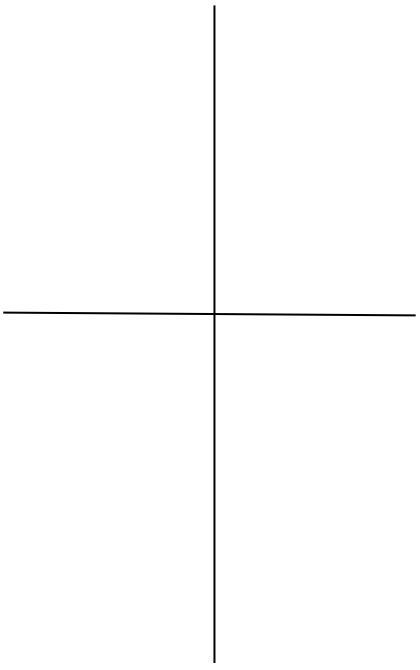
On a separate piece of paper, or in the space below IF you can neatly fit your work, use the following individual vectors to GRAPHICALLY find the resultant vector in the first three problems. Remember, the resultant vector must have both magnitude and direction. Include a scale, for example 1 km = 1 mm. Use Ruler and Protractor!!

First things first, draw each of the below vectors on a separate x-y axis below. 4 pts.

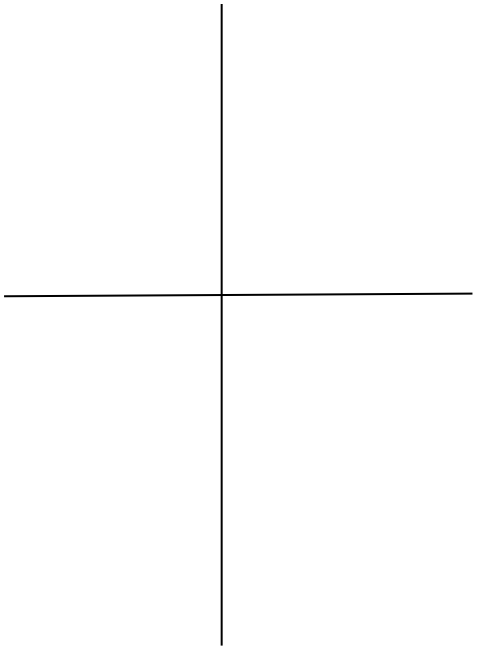
$\vec{A}$ = 35 km at 25° N of E $\vec{B}$ = 15 km at 10° E of N
$\vec{C}$ = 20 km at 57° W of S $\vec{D}$ = 40 km at 28° W of N



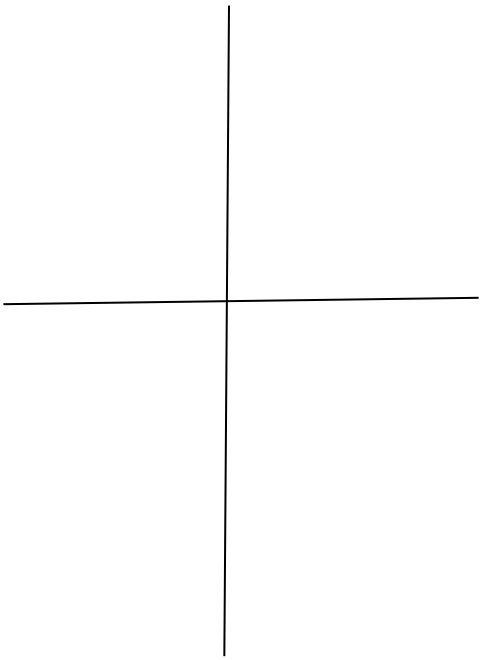
1. $\vec{A} + \vec{B}$ = ? (2pts)



2. $\vec{B} + \vec{C}$ = ? (2pts)

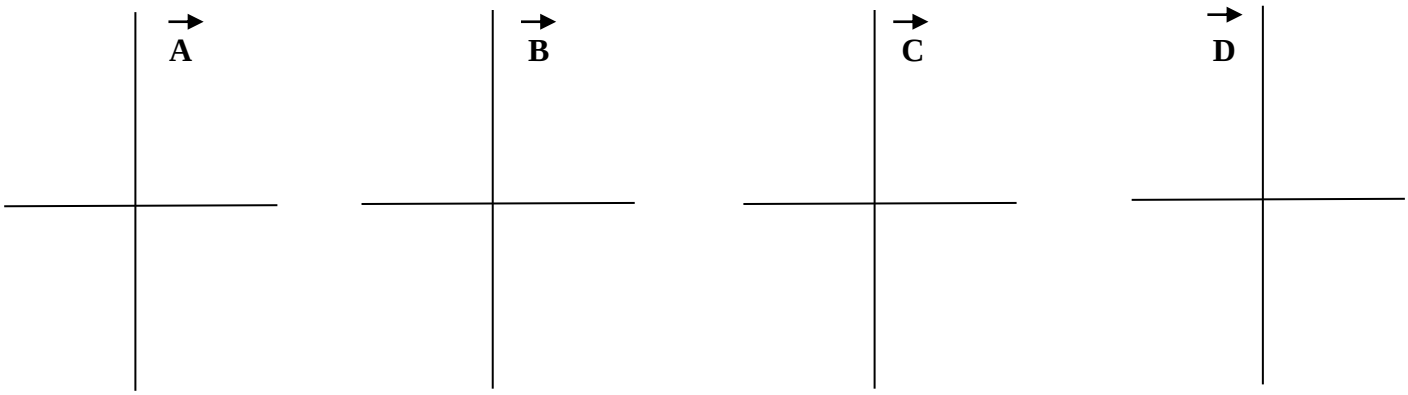


3. $\vec{C} + \vec{D}$ = ? (2pts)

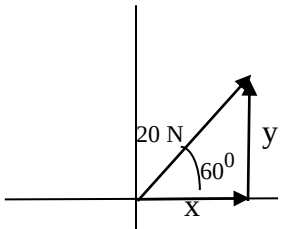


Solve all the following problems MATHEMATICALLY using your calculator. Show all work. Remember, the resultant vector must have both magnitude and direction (an angle).

1. Now, let's assume that $\vec{A}$, $\vec{B}$, $\vec{C}$, and $\vec{D}$ from above are each the resultant of component vectors ("x" and "y"). Redraw the previous vectors **A, B, C and D** in the graphs below BUT it is not necessary to draw to scale. 8 pts



Now add the component "x" and "y" vectors to each of the above vectors so that it resembles the example below. Calculate the value of each component. Remember the below is just an example!! Label the "x" and the "y" component for each vector and clearly show work on how you got the value for each component. 12 pts (3pts each)



EXAMPLE !

$\sin 60^0 = \frac{y}{20N}$ $\quad \cos 60^0 = \frac{x}{20N}$

$y = 17.3\ N$ $\quad x = 10\ N$

In each of the below problems, draw the vector diagram, solving for the quantity asked for in each problem. 3 pts each

2. A boat is heading across a river at a **velocity** of 25 mph. The river is flowing at 10 mph. What is the actual **velocity** of the boat? (**Answer: 26.9 mph @ 68.2^0 downstream relative to the shore.)**

3. You push on a box with a **force** of 500 Newtons directly north. Another person pushes the box with a **force** of 800 Newtons directly east. What is the **resultant** force?
(**Answer: 943.4 N @ 58^0 E of N**)

4. An airplane is flying 340 km/hr at 12^o East of North. The wind is blowing 40 km/hr at 12^o South of East. What is the plane's actual **velocity** (resultant velocity)**?**
(Answer: 342.3 mph @ 71.3^0 N of E)