GSE PreCalculus                                     Name _____
WS 7.4 – Apps Law of Vectors                        Date _____ Day _____

1.  Find the resultant vector for each.  Also, find the magnitude and direction.
    a.  $\langle -16,32 \rangle + \langle 22,11 \rangle$

    b.  $\langle 4,72 \rangle + \langle 37,-127 \rangle + \langle 43,43 \rangle$

2.  The speed of a powerboat in still water is 47 knots per hour (KPH).  The powerboat heads directly west across the Messina River.  The river flows north at 3.5 KPH.  Find the resulting velocity (i.e. speed and direction) of the powerboat.

3.  A ship near the coast is going 5 KPH at an angle of  130°.  The water current is flowing directly due east at 3 KPH.  What is the ships resultant velocity with respect to the current?

4.   A Lear Jet has a speed of 420 MPH in still air.  Suppose the plane travels east and encounters a 50 MPH wind blowing due North.  Find the resulting velocity (speed and direction) of the jet.

5.   An Airstream jet flies 640 MPH in still air.  Suppose the jet is traveling $N45°W$ and encounters a 78 MPH wind blowing $S45°W$ .  Find the resulting velocity (speed and direction) of the jet.

6.  Suppose the Airstream jet above (630 MPH in still air) is traveling $N37°W$ and encounters a 140 MPH wind blowing  $N76°W$ .  Find the resulting velocity (speed and direction) of the jet.

7. Miss Dalton is a tri-athlete and is swimming in the Cape Cod Canal. She swims $45°$ at 2.5 MPH. The current is flowing $S45°W$ at 0.8 MPH. Find Miss Dalton's resulting velocity (speed and direction).

8. Suppose in question #8, that Miss Dalton also has to contend with a 0.5 MPH wind blowing directly east. Find Miss Dalton's resulting velocity (speed and direction).

9. Mr. Johnson is traveling in his powerboat at 35 MPH traveling directly west. The current is flowing at 8 MPH in the direction of $N32°W$. There is also a tailwind of 12 MPH blowing in the direction of $N11°W$. Find the resulting velocity (speed and direction).

10. A 100 Newton force and a 50 Newton force act on the same object. The angle between the forces measures $90°$. Find the magnitude and direction of the resultant force

11. A farmer and his son are removing a large boulder from a well. They are pulling on ropes attached to the boulder. The ropes make a $40°$ angle. If the farmer is pulling with a force of 115 newton and his son is pulling with a force of 105 newtons, what is the magnitude and direction of the net force on the boulder?