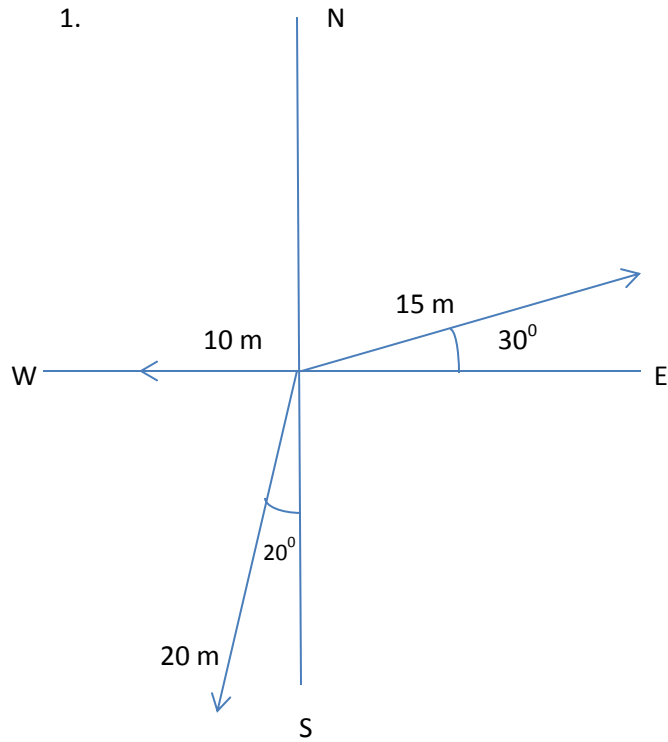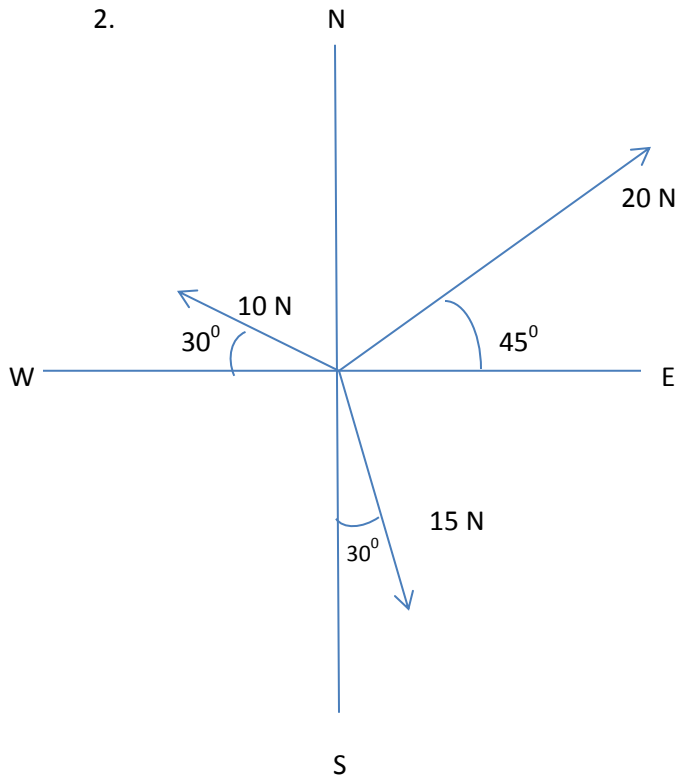Directions:  In each of the following diagrams showing concurrent vectors.  Determine the magnitude and direction of the resultant of these components when added together.  Show your work and label your units.  15 pts each.

1.



N

15 m

10 m       $30^0$

W                                    E

$20^0$

20 m

S

Answer:  11.9 m @ $71.4^0$ S of W

2.

N

20 N

10 N

30°

45°

W ———————————— E

15 N

30°

S

Answer: 14.3 N @ 25.3$^0$ N of E

3. A boat can travel 3.2 m/s in still water.
   a. If the boat points its bow directly across a stream whose current is 1.2 m/s, what is the velocity (magnitude and direction) of the boat relative to the shore? 5 pts.

   | 3.42 m/s @ $69.44^0$ relative to shore |
   | --- |

   b. What will be the position of the boat, relative to its point of origin, after 5 seconds? Draw a diagram and label all appropriate units.  5 pts.

   | 6.0 m downstream, 16.0 m across river, 17.09 m from starting point @ $69.44^0$ relative to shore |
   | --- |