**Physics IA**                    **Worksheet #2 on Vector Forces**

Show all of your work for the following problems on another sheet of paper.

1.  A plane flies at a speed of 175 km/hr North,  while being blown by a wind of 25 km/hr
    East.  What will be the plane's resultant speed and direction ?

2.  Elmer throws a soccer ball at a speed of 14 m/s at an angle of 35° above the horizontal.
    Find the vertical and horizontal components of the ball's velocity.

3.  If a plane can fly at a speed of 240 km/hr when there is no wind,  what will be the
    plane's velocity with respect to the ground,  if his plane is blown at a velocity of 25 km/hr
    to the east ?   If the pilot tries to reach a point 120 km due south,  how far off course will he
    be when he reaches that latitude ?

4.  A group of skate-dudes is using a half pipe ramp for acrobatic maneuvers.  If the angle
    of the ramp is 40° at one point,  find the components of weight for a 50 kg dude.  What
    will be his acceleration in the direction of the incline ?

5. - 7.  Break the following vectors down into their perpendicular components.

5.  345 m at 278°            6.  225 N at 125°                7.  25 m/s at 195°

8.  A surveyer marks out a baseline distance of 250 feet from a bridge which is 100 feet tall.
    What is the angle of inclination of the bridge from the horizontal ?

9.  A man washing windows has set up his ladder, which is 5 meters in length,  so that it
    leans against the wall of a building,  with its base is 3 meters from the base of the wall.
    If there is a window 4.5 meters above the ground, will he be well positioned to clean it ?

10. If you stand back a distance of 520 meters from the Washington monument,  and look
    through a surveyers sextant,  you will observe an angle of 18° elevation above the
    horizontal.  How tall must the monument be  ?

11. An extreme skiier leaps from the top of a hill with an angle of 58° above the
    horizontal.  If his mass was 70 kg,  find the components of his weight.  Would his
    acceleration be any different if  his mass was 50 kg ? Prove your answers by making
    separate vector diagrams for each weight.  Does this answer make sense ?

12.  Draw a vector diagram to add the vectors shown here:
a.                                          b.                              c.



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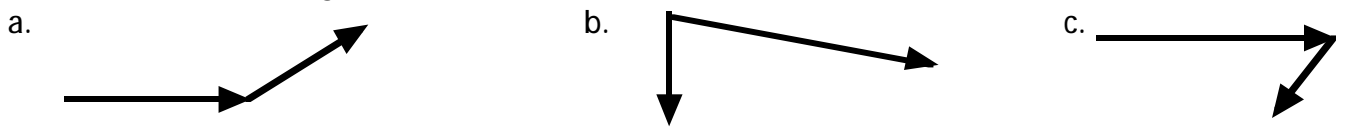
1.  177km/hr at 82×          2.  11.5 m/s across,  8 m/s up        3.  241 km/hr at 276×        4.  F|| = 321 N,  F⊥ = 383 N
5.  342 m South,  48 m East              6.  184 N North,  129 N West            7.  6.5 m/s South,  24 m/s West              8.  22°
9.  The top of the ladder will be 4 m above the ground   10.  It's a whopper - 169 m,  or 560 feet.   11.  a = 8.5 m/s/s