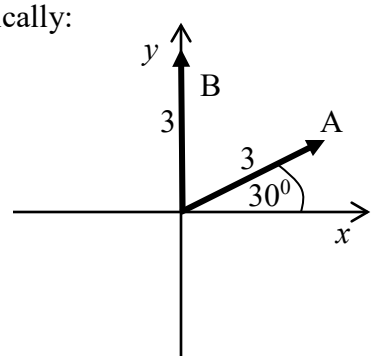
Physics 211 **Problem Set 2** **Due Friday, 09/13/19**
Last Name:_____ **First Name** _____
Workshop time or section:_____**TA name or Room #** _____

Please submit your homework on this sheet. If you need more space than is available, please attach additional sheets of paper.

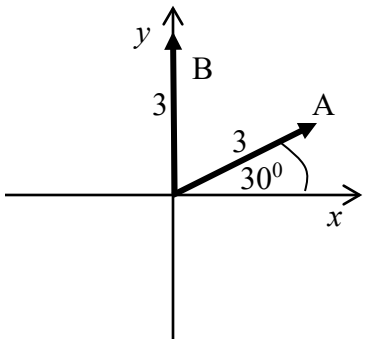
1. Each of the displacement vectors **A** and **B** shown below has a magnitude of 3 m.

i. Find graphically:

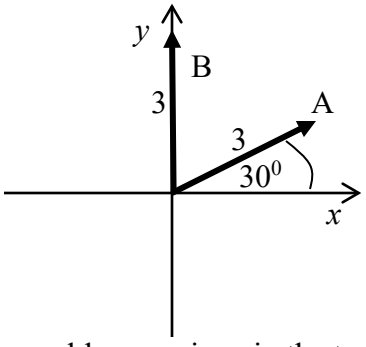
(a) **A** + **B**



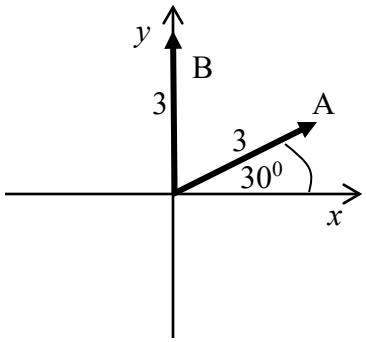
(b) **A** – **B**



(c) **B** – **A**



(d) **A** – 2**B**



ii. In addition to the problem as given in the text, write down the x and y components of vectors **A** and **B**, and find components of the resultant vector in each part obtained by algebraic calculation. Check consistency of the values of these components with the resultant vectors obtained graphically.

A_x = B_x =

A_y = B_y =

(a)
$(A+B)_x$ =

$(A+B)_y$ =

(b)
$(A-B)_x$ =

$(A-B)_y$ =

(c)
$(B-A)_x$ =

$(B-A)_y$ =

(d)
$(A-2B)_x$ =

$(A-2B)_y$ =

2. In a game of American football, a quarterback takes the ball from the line of scrimmage and runs backwards for 10 yards, and then sideways to the left, parallel to the line of scrimmage for 15 yards. At this point, he throws a forward pass at the angle of 60 degrees with respect to the line of scrimmage to the right. Ball flies 50 yards in this direction, before it is caught. What is the total distance between were the ball was initially spotted and were it was caught?

   i. Set up a coordinate system for a drawing, with the *x*-axis along the line of scrimmage pointing to the right and with the *y*-axis pointing downfield.

   ii. Represent each step in ball motion by a displacement vector in your graph.
   iii. Write down *x* and *y* components of each vector.

   iv. Add components up to obtain components of the total displacement.

   v. Calculate magnitude of the total displacement vector.