TREASURE HUNT!

PURPOSE: To determine the resultant of a specified set of vectors in three different ways, including**:**

- A.   Experimentally using a compass (and a crude measuring system)
- B.   Using the scale drawing method ("tip-to-tail")
- C.   Using the analytical (component) method

You will then compare the results obtained from these three methods.

MATERIALS: Compass, chalk, and graph paper

PROCEDURE:
1.   In a large open space choose a starting point and mark it with chalk. Using the compass walk the path set by the vectors using the "tip-to-tail" method with the meter stick. Measure the resultant displacement – both magnitude and direction.

2.   Prepare a scale drawing showing the vector addition of your vectors using the tip-to-tail method. Be sure to draw the vectors <u>in the same order</u> you walked. Make your scale drawing large enough to be accurate. Determine the resultant using the tip-to-tail method of vector addition.

3.   Use the component method (analytical/trig) to calculate the actual value of the resultant. Show all of your work!

> 8 paces E
> 6 paces @ 60° N of E
> 5 paces @ 70° W of N
> 9 paces S
> 3 paces @ 35° E of S
> 4 paces SW

INTERPRETATIONS:
1.   Where is the treasure located with respect to the hunter's starting point?

2.   What is the difference between the distance you walked and your displacement? Please include the difference between scalars and vectors in your answer.

3.   If you reversed the order of your instructions, would that have changed your resultant? Prove with a sketch. What can you say about vector addition?

4.   If vector **A** is 5 m N and vector **B** is 12 m E, what is **A** – **B**? Compare to **B** – **A**. What can you conclude about vector subtraction?

Graphing Method

Analytical Method		
Displacement	x-component (East)	y-component (North)