Physics 40S Lab Activity #1

A Vector Journey

Object
To determine the displacement between two points on a plane (the floor of the school).

Apparatus
A measuring device, such as a meter stick or a measuring tape.

Procedure

1. Choose two of the journeys shown below, making sure that you choose one journey from each floor.
2. Start at the given location.
3. Using your measuring device, measure the vectors in the north-south and east-west directions that are needed to proceed from the starting point to the ending point of your journey.
4. Use any lines on the floor (e.g. tiles) to aid you in maintaining the correct direction.
5. List all of the vector displacements measured to the nearest $0.1\,m$ in the order that the measurements were made.
6. Add these vector displacements in the order that they were made, using a scale diagram.
7. Add these vector displacements in the order that they were made, using vector components.
8. Repeat these steps for your second vector journey.

Journey A
Office door to the entrance to the food services classroom (D2).

Journey B
East entrance of school to the entrance to the cafeteria.

Journey C
Northeast entrance to the theatre to the entrance to the hair styling classroom (B7).

Journey D
Mr. Smith's classroom (2D2) to Ms. Blankenborg's (2E4) classroom.

Journey E
Mr. MacWilliam's classroom (2B?) to the door to the resource area (2E2).

Report
Prepare a report on this vector journey activity by answering the following questions. Be sure to show your work.

This report is worth 16 marks.

1. For your first journey, list the displacements measured in the order they were measured. Use d_1, d_2, d_3, etc. **(1 mark)**

2. Show your work in determining the displacement for this journey by the graphical method (scale diagram). **(3.5 marks)**

   Include:
   - Scale (0.5 mark)
   - The conversion of all vectors according to the scale. (1 mark)
   - A diagram of the addition of the vectors **in the order given**. (1 mark)
   - The correct magnitude for the resultant vector. (0.5 mark)
   - The correct direction for the resultant vector. (0.5 mark)

3. Show your work in determining the displacement for this journey by the component method. **(2.5 marks)**

   Include:
   - Addition of the components in the north-south and east-west directions. (1 mark)
   - A sketch for the addition of the components to produce the resultant vector. (0.5 mark)
   - The correct magnitude for the resultant vector. (0.5 mark)
   - The correct direction for the resultant vector. (0.5 mark)

4. How do the displacements found by the different methods compare? Explain. **(1 mark)**

5. Repeat steps 1 to 4 for your second journey. **(8 marks)**