Today's Learning Goal(s):

By the end of the class, I will be able to:

a) understand the ways vectors were used in this unit to solve problems.

Student presentation groups and E-question due today!
Use next slide...

Correct Yesterday's assigned work:

5.10.2 Student Presentations

Group Members:

Shyann
Emmy
Kayla

Ryan
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Will

Cole

Jakob
Jake K.
Tyler
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Tanvit
Jared
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Jonathan

5.12.1 Reviewing Vectors

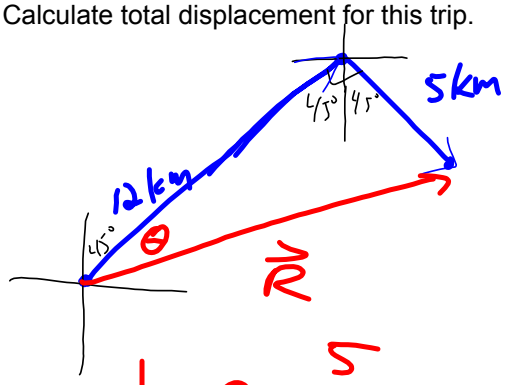
Date: _____

1. For each of the following make a diagram and then calculate the magnitude of the horizontal and vertical components. For the purpose of this assignment N is the unit of force called a Newton.
   a) 650 N at 35º to the horizontal
   b) 45 N at 130º to the horizontal
   c) 1000 N at 20º to the ***vertical*** (or bearing 340º)

2. Find the resultant force of the forces: $\overrightarrow{F_1}$ = 200 N [N 30° E] and $\overrightarrow{F_2}$ = 100 N [E 15° S].

3. A pigeon flies 100 km [E 42 ◦ S] and then 300 km [W].
   What is the total displacement of this pigeon from its starting point?

4. A school bus travelled 12 km [N 45 ° E] and then 5 km [S 45 ° E].
   Calculate total displacement for this trip.



$|\vec{R}| = \sqrt{12^2+5^2}$

$= \sqrt{144+25}$

$= \sqrt{169}$

$= 13\text{ km}$

$\tan\theta = \frac{5}{12}$

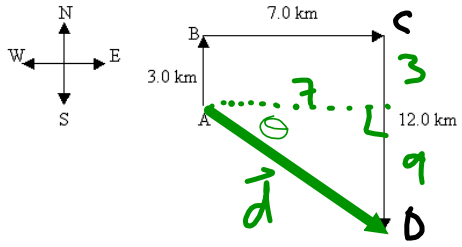
$\theta = \tan^{-1}\left(\frac{5}{12}\right)$

$\doteq 22.619$

$\doteq 22.62$

∴ the displacement is 13 km bearing 067.62°

5. A group of hikers sets out from point A, proceeds to B, then to C, and finally to D.
   The entire trip takes 5.0 h.



$\tan\theta = \frac{9}{7}$

$\theta = \tan^{-1}\left(\frac{9}{7}\right)$

$\doteq 52.125$

$\doteq 52.13°$

a) What is the hikers' total distance relative to their initial position?
b) What is the hikers' final displacement relative to their initial position?

a) total distance $= 3+7+12$

$= 22\text{ km}$

b) $|\vec{d}| = \sqrt{7^2+9^2}$

$= \sqrt{49+81}$

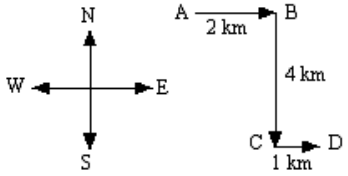
$= \sqrt{130}$

$\doteq 11.4017$

$\doteq 11.402\text{ km}$

b) the final displacement is 11.402 km E 52.13° S

6. The diagram below shows the first three legs of a trip: A to B, B to C, and C to D.
   If a person returns from point D to point A, what is the displacement for this fourth and final leg?



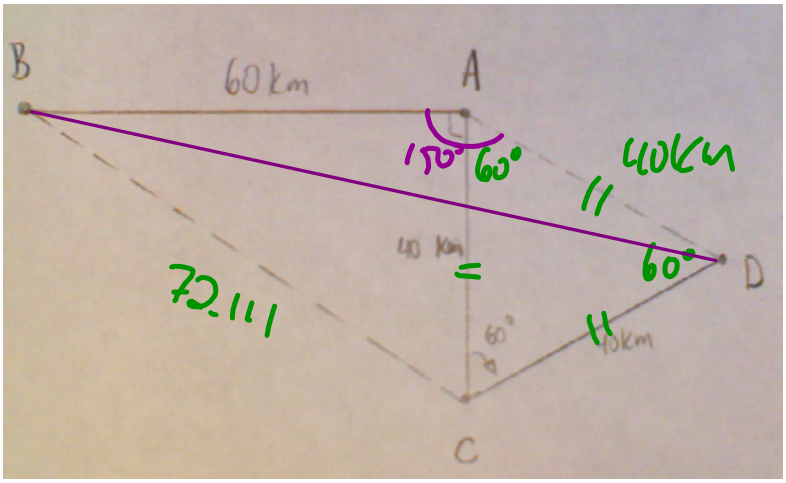
7. Consider the following points: A(2, 5), B(7, 12), C(– 3, 6), D(8, – 2)
   Determine the component vectors:

   a) $\overrightarrow{AB}$ b) $\overrightarrow{BC}$ c) $\overrightarrow{BD}$ d) $\overrightarrow{BA}$ e) $\overrightarrow{CD}$ f) $\overrightarrow{CB}$ g) $\overrightarrow{DA}$

   and the magnitudes (to 3 decimal places): h) $\left|\overrightarrow{BC}\right|$ i) $\left|\overrightarrow{DA}\right|$

Thinking

8. Imagine that you are planning to build a railway line between four remote towns.
The town of Addington is located 60 km [E] of Bracketon.
The town of Cosville is located 40 km [S] of the town of Addington and
Degreesville is located 40 km [N 60° E] of the town of Cosville.
Draw a diagram to show the locations of each town and use this information to determine the minimum length of track that will link the towns (to 3 decimal places).



$|BC| = \sqrt{60^2+40^2}$

$= \sqrt{5200}$

$\doteq 72.1110$

$\doteq 72.111$ km

Distance Total $= 60+40+40+AD+BC+BD$

$\doteq 140+40+72.111+96.731$

$\doteq 252.111+96.731$

$\doteq 348.842$ km

$|BD| = \sqrt{60^2+40^2-2(60)(40)\cos 150°}$

$\doteq 96.7311$

$\doteq 96.731$