Modeling Motion
Orienteering Lab

The following displacement vectors give the distance and bearing from one checkpoint on an orienteering course to the next. At each checkpoint you will find a function which you must record for later use. To complete the orienteering course you have two options. You could take the appropriate bearing with a compass and walk the appropriate distance without reference to a map. Alternatively you could carefully plot the displacement vectors on a map and then use the map to help you find the checkpoints. Which method you use will depend on your orienteering skills and your affinity for bushwhacking in the rain.

Checkpoint	Distance (ft)	Bearing ^{o}
0-1	460	300
1-2	1140	351
2-3	940	53
3-4	690	134
4-5	2340	322
5-6	2030	187
6-7	1910	199
7-8	1710	91

At the end of the orienteering session answer the following questions

1. What is the shortest possible distance you could travel to complete this course?
2. What was your actual distance travelled? (This will be an estimate!)
3. What was your total displacement by the time you reached checkpoint 8?
4. What was your average speed?
5. What was your average velocity (give magnitude and direction)?
6. With the functions from each checkpoint evaluate the composition of functions given by
   $f_8 \circ f_7 \circ f_6 \circ f_5 \circ f_4 \circ f_3 \circ f_2 \circ f_1(x)$ or $f_8(f_7(f_6(f_5(f_4(f_3(f_2(f_1(x)))))))$