507 TI-84 VECTOR PROBLEMS

1. Draw out vectors on a Cartesian graph
2. Make sure all Angles start from 0 degrees
3. Use your Ti-84 calculator and your STAT List to complete calculations.
4. Write down lists as show in example # 5
5. Include ΣX and ΣY

5. An Arctic tern flying to Antarctica encounters a storm. The tern changes direction to fly around the storm. If the tern flies 46 km at 15° south of east, 22 km at 13° east of south, and finally 14 km at 14° west of south, what is the tern's resultant displacement?

L1 = magnitude	L2 = angle	L3 = L1cos(L2)	L4 = L2sin(L2)
46	345	44.433	-11.91
22	283	4.9489	-21.44
14	256	-3.387	-13.58

ΣX = 45.994 Resultant = 65.7km 45.6 degrees South of East

ΣY = -46.93

C = $\sqrt{45.99^2 + -46.93^2}$

$\text{Tan}^{-1}(\frac{46.93}{45.99})$

6. A technique used to change the direction of space probes, as well as to give them additional speed, is to use the gravitational pull of nearby planet. This technique was first used with the Voyager probes. Voyager 2 had traveled about 6.3×10^8 km when it reached Jupiter. Jupiter's gravity changed Voyager's direction by 68°. The probe then traveled about 9.4×10^8 km when it reached Saturn, and its direction was changed by 94°. Voyager 2 was now redirected; it encountered Uranus after traveling 3.4×10^9 km from Saturn. Use this information to calculate the resultant displacement of Voyager 2 as it traveled from Earth to Uranus.

7. The city of Amsterdam, in the Netherlands, has several canals that connect different sections of the city. Suppose you take a barge trip to the harbor, starting at a point near the northwest corner of the Vondelpark. You would sail 2.50×10^3 m at 58.5° north of east, 375 m at 21.8° north of east, and 875 m at 21.5° east of north. What would be your resultant displacement?

8. The elevated train, or "L," in Chicago is a major source for mass transit in that city. One of the lines extends from Jefferson Park, in the northwest part of town, to the Clark Street station downtown. The route of this line runs 5.0 km at 36.9° south of east, 1.5 km due south, 8.5 km at 42.2° south of east, and 0.8 km due east. What is the resultant displacement of an "L" train from Jefferson Park to Clark Street?

9. A billiard table is positioned with its long side parallel to north. A cue ball is then shot so that it travels 1.41 m at an angle of 45.0° west of north, is deflected by the table's left side, and continues to move 1.98 m east of north at an angle of 45.0°. The ball is then deflected by the table's right side, so that it moves 0.42 m west of north at an angle of 45.0°. After a reflection on the north end of the table, the ball travels 1.56 m at an angle of 45.0° south of west. Determine the resultant displacement of the cue ball.

10. Hurricane Iniki was the most destructive cyclone to have crossed the Hawaiian Islands in the twentieth century. It's path was also unusual: it moved south of the islands for 790 km at an angle of 18° north of west, then moved due west for 150 km, turned north and continued for 470 km, and finally turned back 15° east of north and moved 240 km to cross the island of Kauai. What was the resultant displacement of Hurricane Iniki?