Station 2: Locating an Epicenter

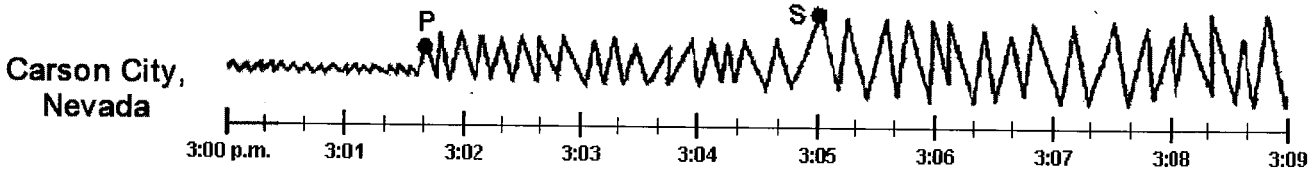
Directions: You will determine the location of an epicenter using data collected at three seismic stations.

1. Seismic Station 1 is in Austin, Texas. On your answer sheet, the distance from the epicenter to Austin is drawn with a circle.

2. Seismic Station 2 is in Trenton, New Jersey. Using the information given, draw a circle for the distance to Trenton.

Distance from Seismic Station Trenton to the Epicenter
1,700km

3. Seismic Station 3 is in Carson City, Nevada. Use the seismograph below to determine the difference in arrival time of the P-wave and the S-wave. Record this value in the space provided on your answer sheet.



4. Using the Earthquake chart provided, determine the epicenter distance for Carson City. Record this value in the space provided on your answer sheet.

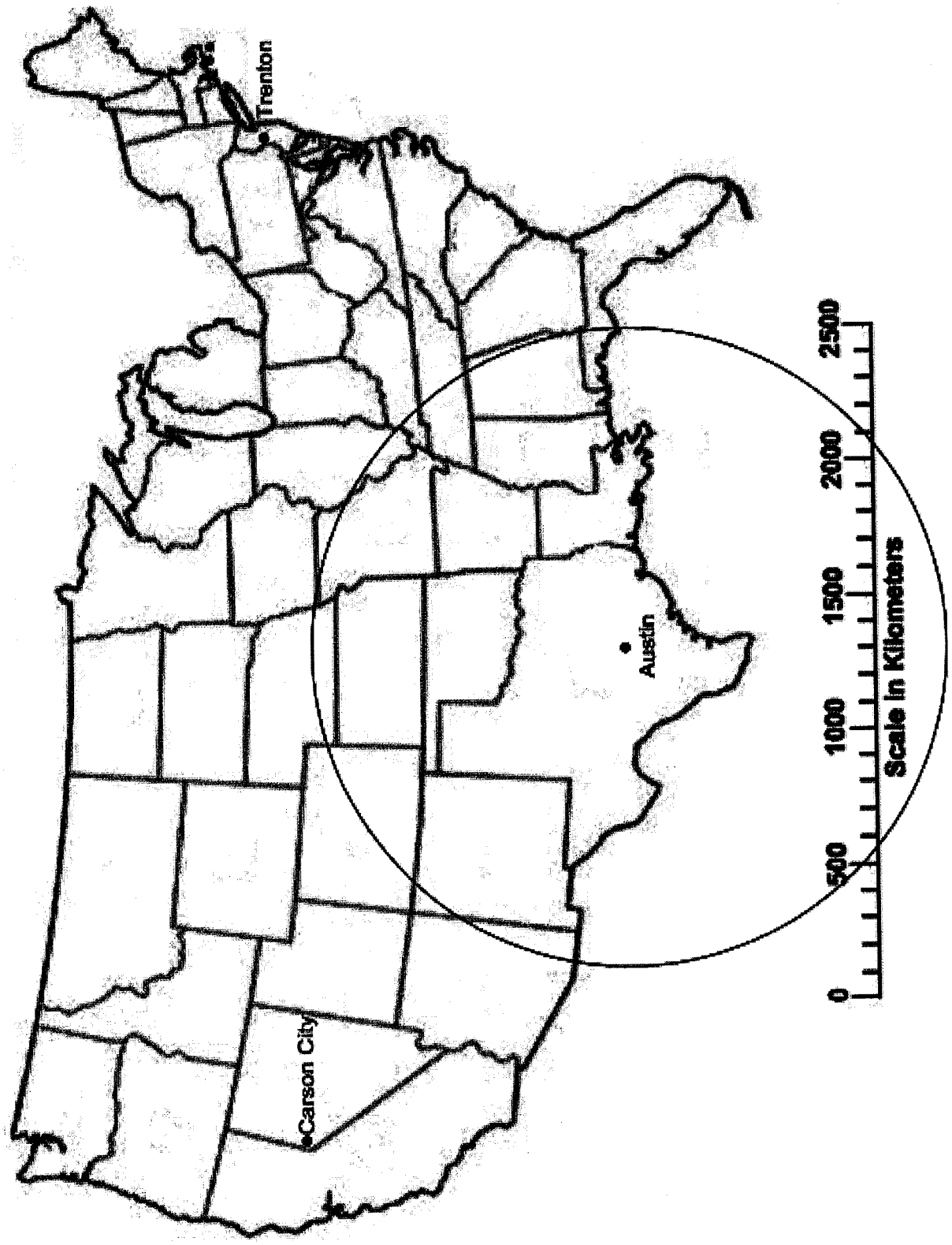
5. Use your calculated distance and a compass to plot a circle on the map for the epicenter distance for Carson City.

6. Draw an X on the map where the epicenter is located.

Distance from Station 2 to Epicenter = _____ km

Difference in P-wave and S-wave Arrival time at Station 3: _____ min _____ sec

Distance to Epicenter from Station 3 = _____ km



Station 3: Constructing and Analyzing an Elliptical Orbit

Review: Rounding to the nearest tenth and thousandth.

Rounding Directions: Round the following numbers to the nearest tenths place.

1. 17.1257 = _____
2. 85.7899 = _____
3. 45.63258 = _____
4. 101.15342 = _____
5. 6.99652 = _____
6. 9.608712 = _____

Rounding Directions: Round the following numbers to the nearest thousandths place.

1. 17.1257 = _____
2. 85.7899 = _____
3. 45.63258 = _____
4. 101.15342 = _____
5. 6.99652 = _____
6. 9.608712 = _____

Directions: On the following pages, ellipses of Asteroid #1 and Asteroid #2 have been drawn for you. For each ellipse, it is your job to:

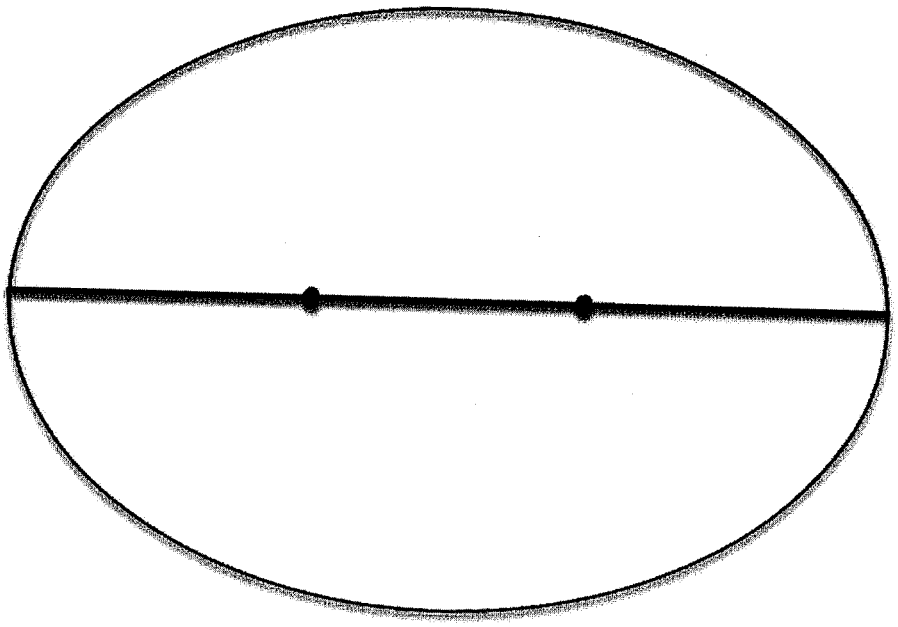
1. Place the word "Sun" over one of your foci to show the position of the Sun.
2. Place a "V" on the constructed orbit where the asteroid has the greatest orbital velocity.
3. Use a metric ruler to measure the distance between foci (d) to the nearest tenth.
4. Use a metric ruler to measure the length of the major axis (L) to the nearest tenth.
5. Calculate the eccentricity of the asteroid to the nearest thousandth.
6. Compare the eccentricity of the asteroids orbits to the eccentricity of other planets.
7. Explain how the eccentricity data supports each of your answers for Letter F.

Solar System Data

Celestial Object	Mean Distance from Sun (million km)	Period of Revolution (d=days) (y=years)	Period of Rotation at Equator	Eccentricity of Orbit	Equatorial Diameter (km)	Mass (Earth = 1)	Density (g/cm^3)
SUN	—	—	27 d	—	1,392,000	333,000.00	1.4
MERCURY	57.9	88 d	59 d	0.206	4,879	0.06	5.4
VENUS	108.2	224.7 d	243 d	0.007	12,104	0.82	5.2
EARTH	149.6	365.26 d	23 h 56 min 4 s	0.017	12,756	1.00	5.5
MARS	227.9	687 d	24 h 37 min 23 s	0.093	6,794	0.11	3.9
JUPITER	778.4	11.9 y	9 h 50 min 30 s	0.048	142,984	317.83	1.3
SATURN	1,426.7	29.5 y	10 h 14 min	0.054	120,536	95.16	0.7
URANUS	2,871.0	84.0 y	17 h 14 min	0.047	51,118	14.54	1.3
NEPTUNE	4,498.3	164.8 y	16 h	0.009	49,528	17.15	1.8
EARTH'S MOON	149.6 (0.386 from Earth)	27.3 d	27.3 d	0.055	3,476	0.01	3.3

Part 9: Lab Practical

Asteroid #1



Distance between foci,
to the nearest tenth of a centimeter _____ cm

Length of major axis,
to the nearest tenth of a centimeter _____ cm

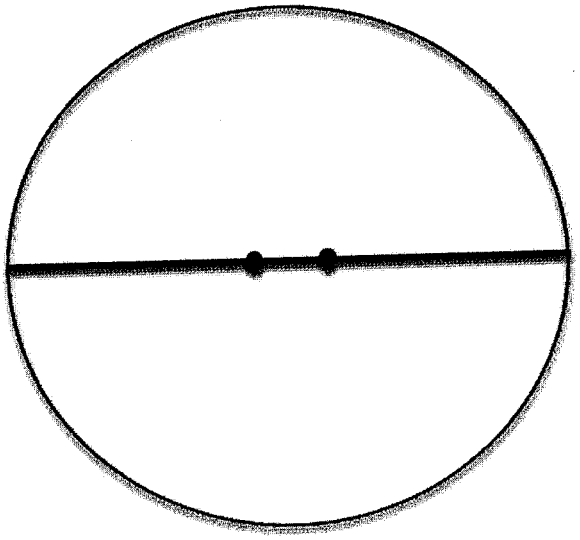
Eccentricity of the asteroid's orbit (constructed ellipse), to the nearest thousandth _____

Use your reference table to fill-in the eccentricity of each planet below. Then, compare the eccentricity of Asteroid #1 to the eccentricity of each planet by placing an X in the column that best describes the relationship.

Planet	Eccentricity	Asteroid's orbit is less eccentric than the planet's orbit	Asteroid's orbit is more eccentric than the planet's orbit	Asteroid's orbit and the planet's orbit are equally elliptical
Mercury				
Venus				
Earth				
Mars				
Jupiter				
Saturn				
Uranus				
Neptune				

Explain how the eccentricity data supports each of your answers on the table above.

Asteroid #2



Distance between foci,
to the nearest tenth of a centimeter _____ cm

Length of major axis,
to the nearest tenth of a centimeter _____ cm

Eccentricity of the asteroid's orbit (constructed ellipse), to
the nearest thousandth _____

Use your reference table to fill-in the eccentricity of each planet below. Then, compare the eccentricity of Asteroid #2 to the eccentricity of each planet by placing an X in the column that best describes the relationship.

Planet	Eccentricity	Asteroid's orbit is less eccentric than the planet's orbit	Asteroid's orbit is more eccentric than the planet's orbit	Asteroid's orbit and the planet's orbit are equally elliptical
Mercury				
Venus				
Earth				
Mars				
Jupiter				
Saturn				
Uranus				
Neptune				

Explain how the eccentricity data supports each of your answers on the table above.