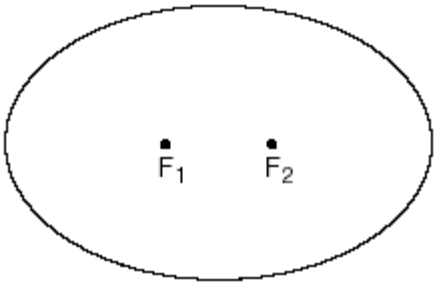
Name _____ Date _____

Calculating Eccentricity and Kepler's Laws

Formula: **eccentricity =** $\frac{\text{distance between foci}}{\text{length of major axis}}$

1. Using a ruler and the eccentricity formula, calculate the eccentricity value of the orbit shown to the right.



Write Formula:

Substitute Data:

Solve (rounded to the thousandths place):

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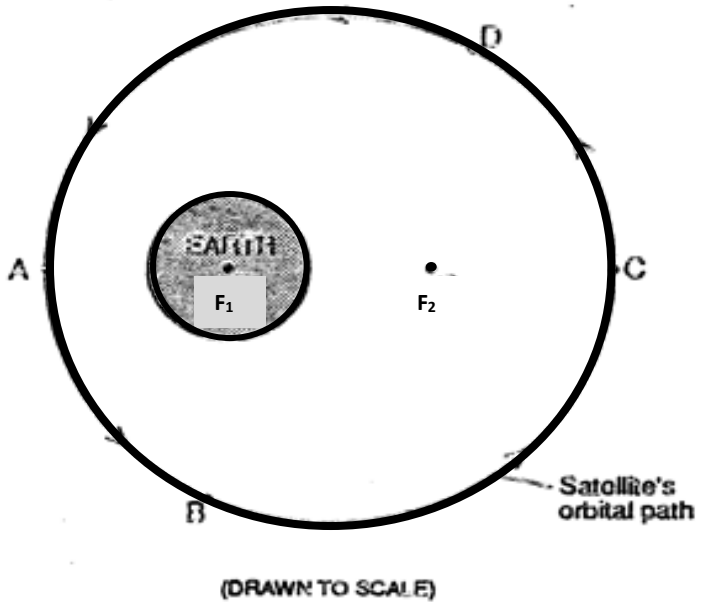
2. The diagram to the right shows an orbit of a satellite traveling around the Earth.



Use a ruler to measure the following:

a. distance between foci (to the nearest tenth of a cm):

_____

b. length of the major axis (to the nearest tenth of a cm)

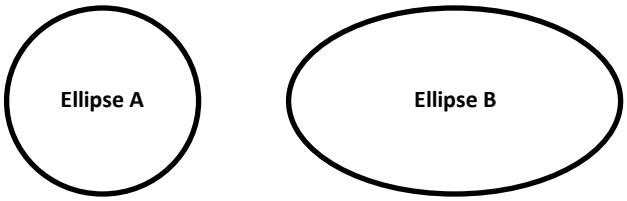
_____

c. Substitute the data into the formula to get the eccentricity value of the satellite's orbit.(round your answer to the nearest thousandths place). _____

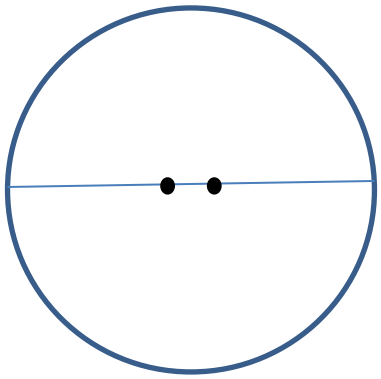
d. At which lettered point in its orbit will the satellite have the greatest orbital velocity? _____

e. d. At which lettered point in its orbit will the satellite have the least gravitational attraction to Earth? _____

3. Orbits with a higher eccentricity value
   (1) are more elliptical and appear more oval-shaped
   (2) are less elliptical and appear more circular
   (3) are more elliptical and appear more circular
   (4) are less elliptical and appear more oval-shaped



The diagram to the right represents the orbit of a new planet as it revolves around a star in the far reaches of the Milky Way.



4. Use a ruler to measure the following:

a. distance between foci (to the nearest tenth of a cm) - _____

b. length of the major axis (to the nearest tenth of a cm) - _____

c. Substitute the data into the formula to get the eccentricity value of the orbit of this new planet.(round your answer to the nearest thousandths place.) _____

d. What is the eccentricity of Earth's orbit? _____

e. Which orbit is more elliptical: Earth's orbit or the newly discovered planet's orbit? _____

Explain your answer using numerical data. _____

_____

_____