

Name: \_\_\_\_\_ Due: \_\_\_\_\_

275

Ref tables and calculator needed

### Ellipses – Calculating Eccentricity

Eccentricity measures how *different from a circle* an ellipse is. Eccentricity will always be between 0 and 1, so eccentricity will be a decimal. Eccentricity has no units.



$e = 0$



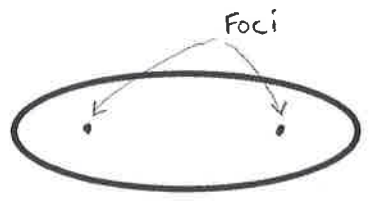
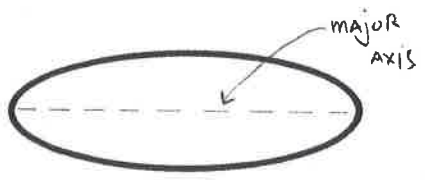
$e = 0.6$



$e = 1.0$

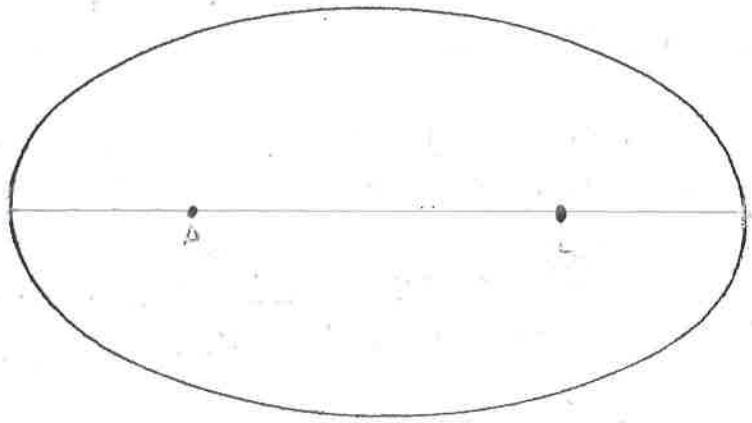
Write the formula for eccentricity in the box below (hint: ref tables)

Hints:



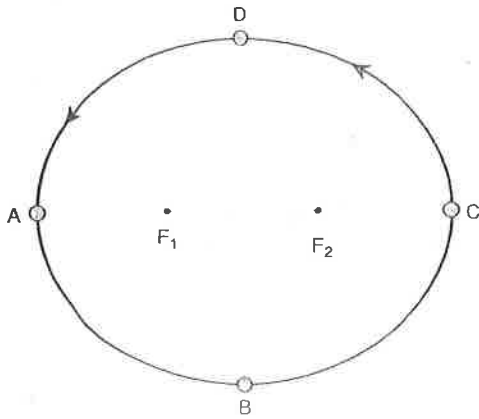
Calculate the eccentricity of each ellipse below. Please show your math. Express each answer to the nearest *thousandth*.

1.



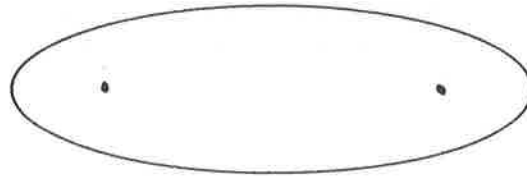
ANSWER: \_\_\_\_\_

5.

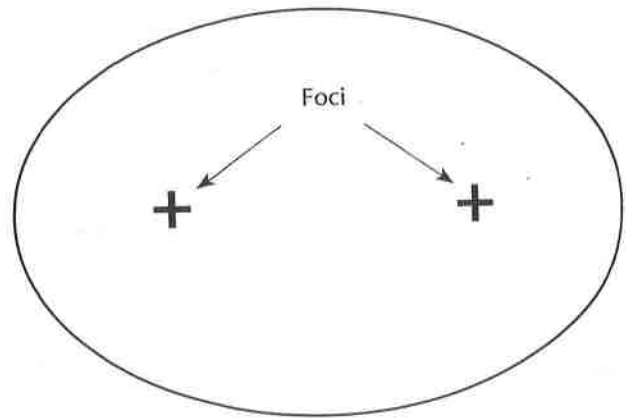


ANS: \_\_\_\_\_

6. Draw in the major axis on the ellipse to the right. Label it "major axis".



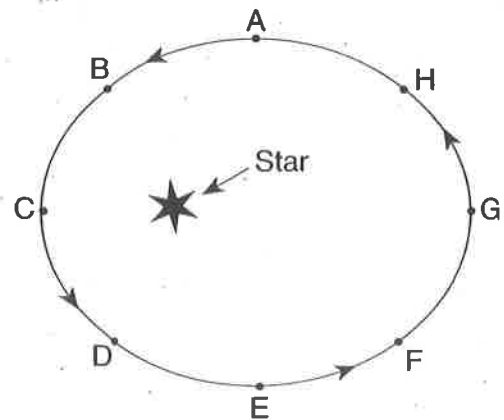
7. Calculate the eccentricity of the ellipse to the right.

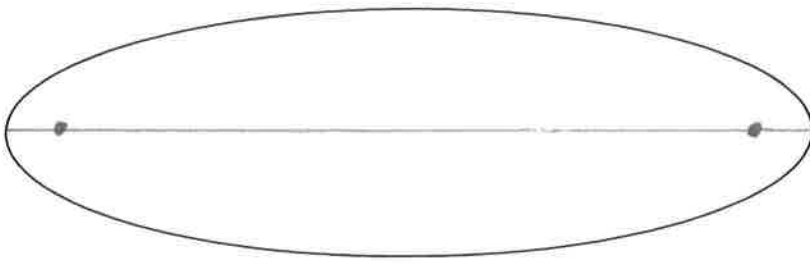


ANS: \_\_\_\_\_

8. **Important:** *The closer the planet is to the star, the faster it moves in its orbit.*

- a) \_\_\_\_\_ At which location is the planet traveling fastest?
- b) \_\_\_\_\_ At which location is the planet traveling slowest?
- c) \_\_\_\_\_ Which of these locations does the planet have the fastest orbital velocity: *B, A, H*
- d) \_\_\_\_\_ Which of these locations does the planet have the slowest orbital velocity: *B, D, E*
- e) \_\_\_\_\_ Which of these locations is the planet speeding up: *D, E, F, G, H*

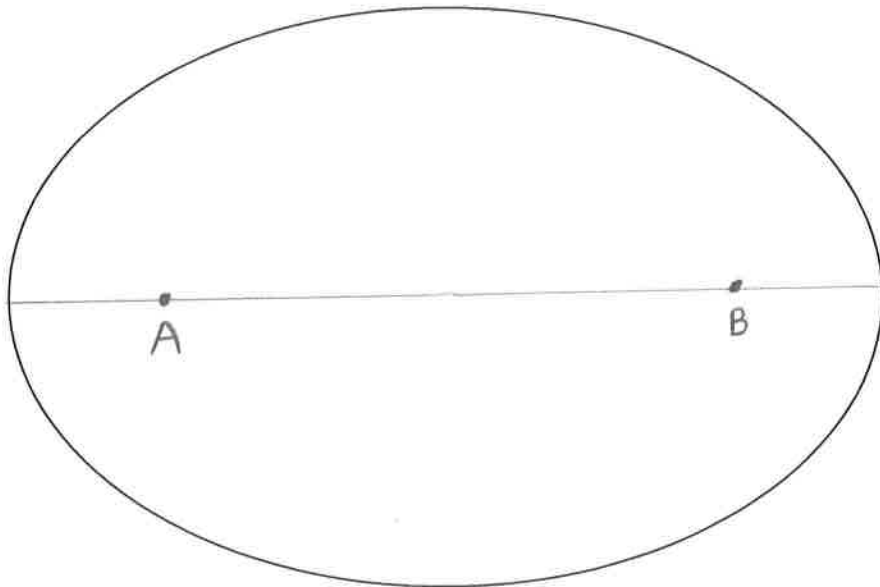




9. Eccentricity: \_\_\_\_\_

10. \_\_\_\_\_ What is the eccentricity of Saturn? (*hint: ESRT pg 15*)

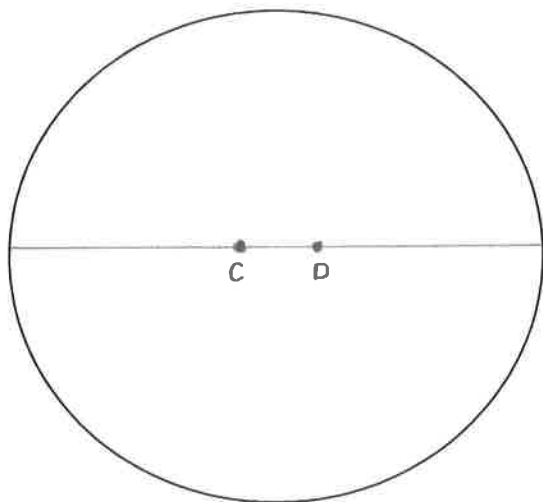
11. \_\_\_\_\_ Which is more elliptical, the ellipse above or Saturn's orbit?



12. Eccentricity: \_\_\_\_\_

13. \_\_\_\_\_ Which is more elliptical, the ellipse above or the orbit of a planet with an eccentricity of 0.864?

14. If the star was at point A, draw an **X** on the orbit where the planet will have the highest orbital velocity.



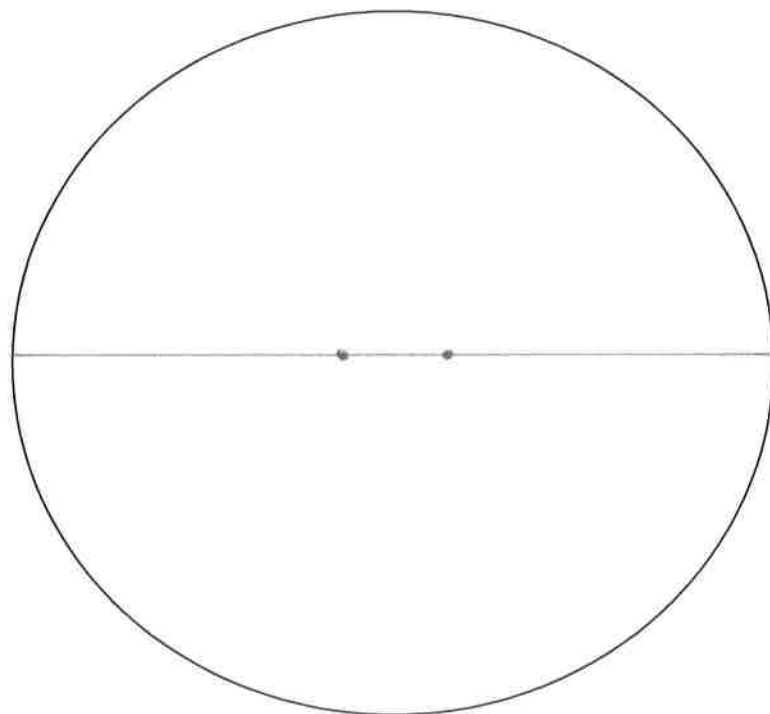
15. Eccentricity: \_\_\_\_\_

16. \_\_\_\_\_ What is the eccentricity of Jupiter? (*hint: ESRT pg 15*)

17. \_\_\_\_\_ Which is more elliptical, the ellipse above or the orbit of Jupiter?

18. If the star was at D, draw an **X** on the orbit where the orbital velocity would be fastest.

*of the planet*



19. Eccentricity: \_\_\_\_\_

20. \_\_\_\_\_ What is the eccentricity of Mercury? (*hint: ESRT pg 15*)

21. \_\_\_\_\_ Which is more elliptical, the ellipse above or the orbit of Mercury?