

46. (a) The distance from the center of an ellipse to a focus is ae where a is the semimajor axis and e is the eccentricity. Thus, the separation of the foci (in the case of Earth's orbit) is

$$2ae = 2 (1.50 \times 10^{11} \text{ m}) (0.0167) = 5.01 \times 10^9 \text{ m} .$$

- (b) To express this in terms of solar radii (see Appendix C), we set up a ratio:

$$\frac{5.01 \times 10^9 \text{ m}}{6.96 \times 10^8 \text{ m}} = 7.2 .$$