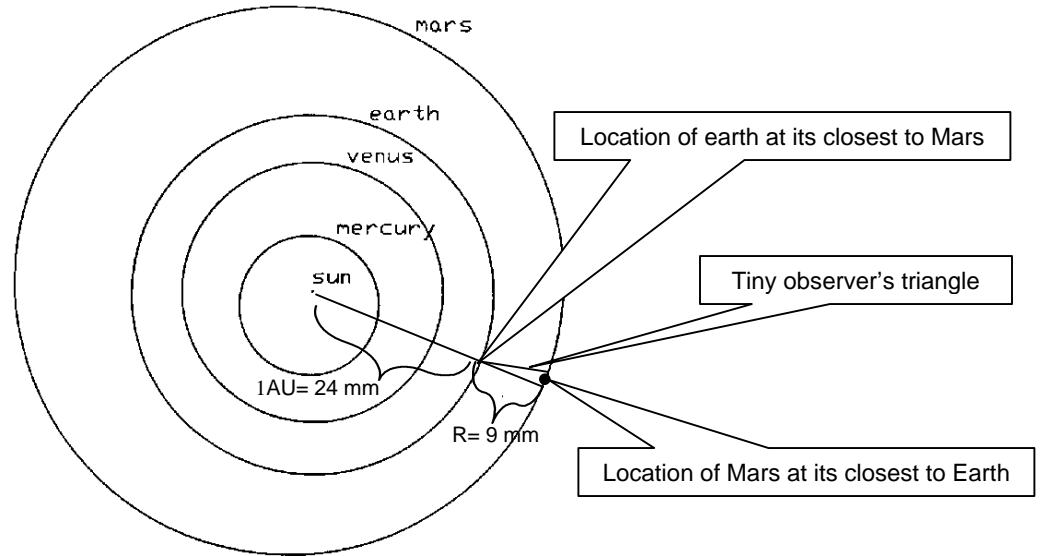


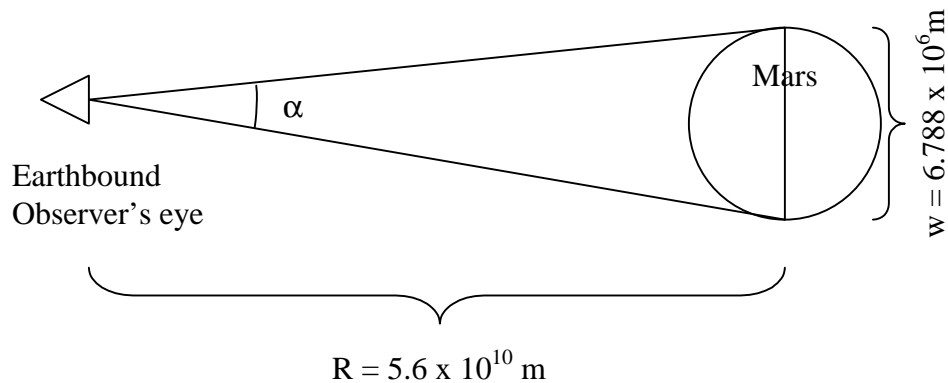
How big is Mars on the sky?



In this diagram, 1 AU is represented by 24mm, and the smallest distance between the orbits of Mars and the earth is 9 mm. One AU is equal to $1.5 \times 10^{11} \text{ m}$. Therefore, at its closest to earth, Mars must be

$$9\text{mm} \times \frac{1\text{AU}}{24\text{mm}} \times \frac{1.5 \times 10^{11} \text{ m}}{1\text{AU}} = 5.6 \times 10^{10} \text{ m away from earth.}$$

The radius of Mars is 3394km, so its diameter is 6788km, or $6.788 \times 10^6 \text{ m}$. With the observer's triangle, we can calculate the angular diameter of Mars, that is, the angle it takes up on the sky.



According to the observer's triangle,

$$\frac{w}{R} = \frac{\alpha}{57.3\text{deg}}, \text{ so } \alpha = 57.3\text{deg} \times \frac{w}{R}.$$

In this case, Mars takes up

$$\alpha = 57.3\text{deg} \times \frac{6.788 \times 10^6 \text{ m}}{5.6 \times 10^{10} \text{ m}} = 6.9 \times 10^{-3} \text{ deg on the sky.}$$