Area of the quarter of a circle circle is $\pi \times x^2 \times \dfrac{1}{4} = \dfrac{x^2\pi}{4}$

Area of triangle ABO is $\dfrac{x^2}{2}$

Area of segment created by the chord AB $\dfrac{x^2\pi}{4} - \dfrac{x^2}{2} = \dfrac{x^2\pi - 2x^2}{4}$ is

Length AB is $\sqrt{(x^2 + x^2)} = \sqrt{(2x^2)} = x\sqrt{2}$

Therefore the radius of the small semicircle is $\dfrac{x\sqrt{2}}{2}$

Area of the small semicircle is $\left(\dfrac{x\sqrt{2}}{2}\right)^2 \times \pi \times \dfrac{1}{2} = \dfrac{2x^2\pi}{8} = \dfrac{x^2\pi}{4}$

Area of lune is $\dfrac{x^2\pi}{4} - \dfrac{x^2\pi - 2x^2}{4} = \dfrac{2x^2}{4} = \dfrac{x^2}{2}$

To do the quadrature of the lune, we need a square with an area equal to the lune's so:

Length of side of a square is: $\dfrac{\sqrt{(x^2)}}{\sqrt{2}} = \dfrac{x}{\sqrt{2}} = \dfrac{x\sqrt{2}}{2}$ which is half the length of AB, so

it can be constructed using a straightedge and a compass.