

**MORE EXERCISES RELATED TO** history04\*.pdf, \* = X,Y,Z

**11.** Prove the following calculus identities for the chord function discussed in the notes and preceding exercises:

$$\frac{d}{dx} \operatorname{crd} x = \sqrt{1 - \operatorname{crd}^2 x}, \quad \frac{d^2}{dx^2} \operatorname{crd} x = -\frac{1}{4} \operatorname{crd} x$$

**12.** If we are give a circular wedge with radius  $r$  and angle opening  $\theta$  (measured in radians), then a standard formular states that the area of the region is equal to  $\frac{1}{2} r^2 \theta$ . Prove this formula when  $0 < \theta < \frac{1}{2} \pi$  using the setup in the file **sector-area.pdf** together with the following formula from a table of indefinite integrals:

$$\int \sqrt{1 - x^2} dx = x\sqrt{1 - x^2} + \frac{1}{2} \arcsin x + C$$