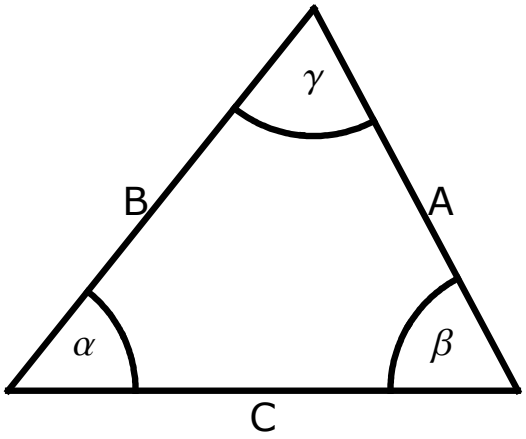
New Astronomy Geometry Work

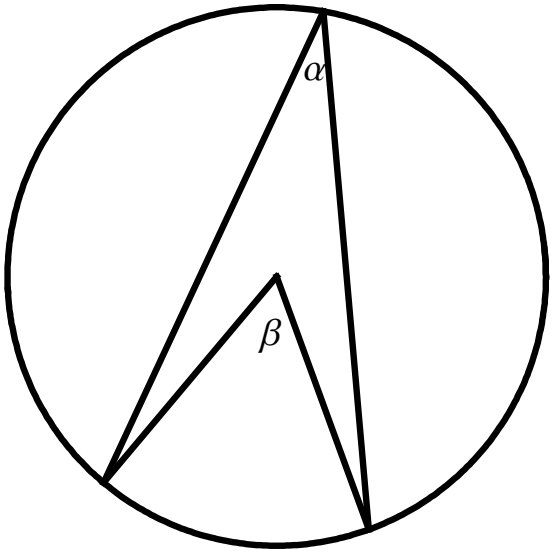
1.) Prove the law of sines:

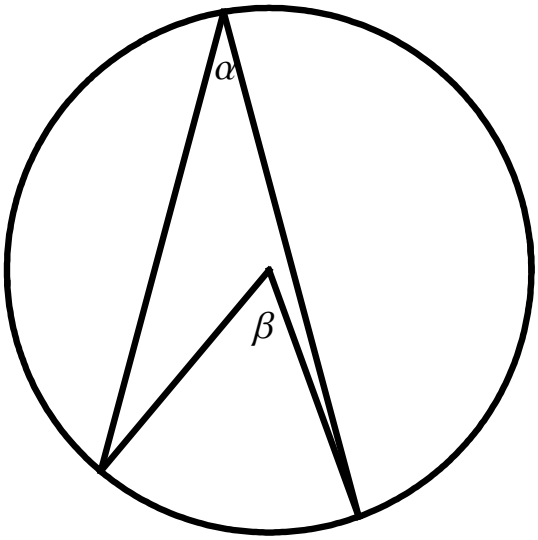
$$\frac{\text{Sin}\,\alpha}{\text{A}} = \frac{\text{Sin}\,\beta}{\text{B}} = \frac{\text{Sin}\,\gamma}{\text{C}}$$



2.) Can you prove that the angle from the center is double that from the circumference?

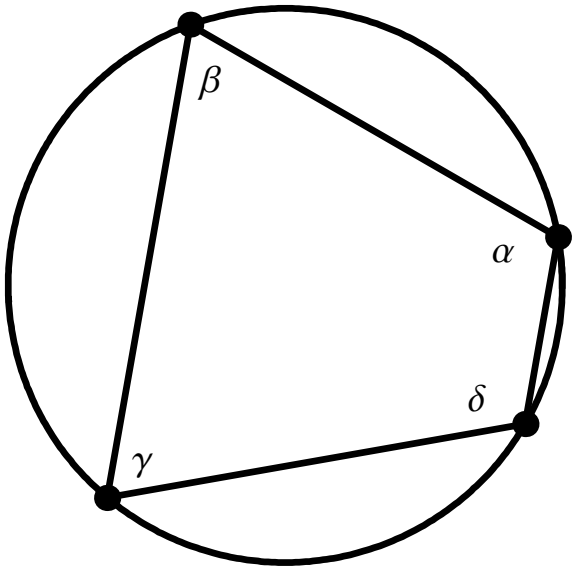
Is $\beta = 2 \bullet \alpha$?





3.) It is said that one, unique circle can be constructed from three points. Can you draw the circle that connects these three points?

4.) While working on the Vicarious Hypothesis in chapter 16, Kepler says that the sum of the opposite angles of a quadrilateral makes 180° when it lies on a circle. Why is this true?



Can you prove that $(\alpha + \gamma) = (\beta + \delta) = 180°$?

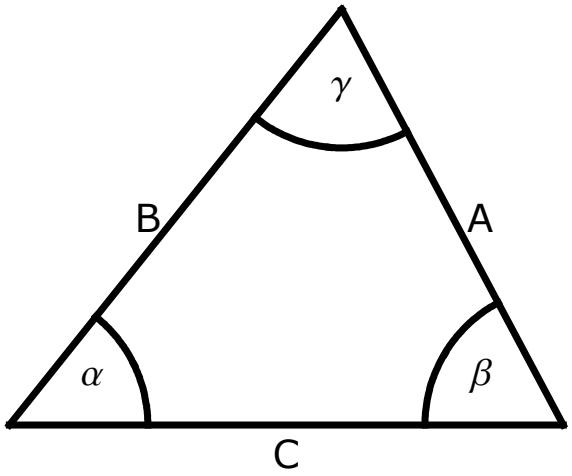
5.) Although it is impossible to perceive a Mars year with the eyes, it can be seen by the mind. What you *can* see is that a Mars opposition occurs every 780 days, on average. Can you figure out, from this, how long a Mars year is?

6.) Can you prove the Law of Tangents? [tough one!]

This gets used in a number of places, including in chapter 26. When you know two sides and their included angle in a triangle, you can no longer use the law of sines, but rather the law of tangents. Prove that it works.

Is it true that:

$$\frac{(A-B)}{(A+B)} \frac{\text{Tan}(180°-\gamma)}{2} = \frac{\text{Tan}(\alpha-\beta)}{2} ?$$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