1. Find the analytic formula for the trisectrix. (You will need trigonometry.)
2. Show that in a Pythagorean triple, if one of the terms is odd, then two of them must
   be odd and one even.
3. Show that in a Pythagorean triple, if the largest term is divisible by 4, then so are
   the other two terms.
4. Show that $\sqrt{5}$ is incommensurable. Use your argument to show that every
   non-square number is incommensurable.
5. Given that an equilateral pentagon and triangle can be inscribed in a circle, show
   how to inscribe a 15-gon in a circle. (Note. This must be established strictly by
   Euclidean construction.)
6. Show the other part of the double reductio ad absurdem argument for proving the
   Eudoxus theorem that the ratio of the areas of two circles are as the squares of their
   diameters. That is, you need to obtain the contradiction using circumscribed $6 \cdot 2^n$-
   gons. (The proof is very similar.)
7. Show the iterative nature of the subdivision of a line into extreme and mean ratio.
   That is, one the initial construction is complete, show how to subdivide the larger of
   the length into extreme and mean ratio, and so on.
8. We know it is impossible to square the circle, but various figures can be “squared.”
   Carry out the following constructions.
   a. Square any rectangle. (Hint. This is the same as solving the equation
      \[ x^2 = ab \]
      geometrically, and in turn this amounts to determining a square
      root geometrically. Of course, there is a multiplication problem
      embedded here, namely finding the product \( ab \), once again
      geometrically.)
   b. Square any triangle. (Hint. This is easy once you have “squared” the
      rectangle. Why? Yet there is still some work to do.)
   c. From this show how to square any polygonal figure.
9. Find a construction to solve the equation \( 6 : 3 = 4 : x \).
10. Find a construction of the division of a line into two portions with lengths in the
    ratio $\sqrt{2} : 1$. 