The golden ratio

1. A line $AC$ is said to have been divided in the golden ratio by B if $AC : AB = AB : BC$.

Suppose $BC = 1$ and $AB = x$. Write the equation in algebraic terms.

2. If you were asked to find the value of the golden ratio using algebra, what quadratic equation would you have to solve? (just write down the equation)

3. Using your calculator, solve this equation graphically to find an approximate value of the golden ratio.

4. Use algebra to solve the equation you found in (2) in two different ways to find the exact value of the golden ratio.
   (i) By completing the squares
   (ii) By any other algebraic method of your choice (name the method and perform it)

5. Check your answers with the values given by the GSP.