D group calculus task:

Edited at 10am 10 April 2017.

Orthogonal polynomials:

1. Find the *10-th* orthogonal polynomials.

Hyperbolic functions:

2. What are cosh, sinh, tanh?

3. Optimization:

Derive the equations, find all the values and give all the ratios for these optimization problems:

3.1. Given the perimeter P = *2* meters, find the maximum areas of the rectangle, the right angled triangle and any triangle.

Find the sides and the ratios of all sides of the rectangle and the triangles.

3.2. Given the surface area S = *6* squared meters, find the maximum volume of the cylinder and the cone (with lid and with no lid).

Find R, H and the ratios of R/H for all cases.

Complex numbers:

4. Give expressions for sum, difference, product, quotient, power and root of complex numbers.

5. Calculate.

a. 5 + 2i – 2 + 7i = . . .

b. (2i – 9)(4 + 7i) = . . .

c. (2i + 9)÷(4 + 7i) = . . .

d. (2i + 9)9 = . . .

e. 10.125 = . . .

6. Give equation of algebraic fractal.

Deadline: 15.4.2017 Saturday.