

Self-evaluation test

Mathematics

Task 1: Write down a polynomial equation.

Task 2: Write down a differential equation.

Task 3: Differentiate following function:

$$f(x) = x^2 \cos(x)$$

Task 4: Calculate following integral:

$$\int_0^1 x e^x dx$$

Task 5: There are two ways to express a complex number z . Please write them down. How are they connected?

Task 6: Simplify the following expression:

$$\frac{4 + 3i}{1 + 2i}$$

Task 7: Calculate the result of the following expression:

$$\begin{pmatrix} 3 & 2 & 4 \\ 5 & 8 & 3 \\ 4 & 5 & 7 \end{pmatrix} \cdot \begin{pmatrix} 2 \\ 1 \\ 5 \end{pmatrix}$$

Physics

Task 1: If a metal is cooled down, how does this affect the conductivity (stays unchanged, increases or decreases)? Explain your answer - what is the physics behind it?

Task 2: What is the name of the fundamental equations of electromagnetism? Can you write down any?

Task 3: Please explain in simple words what a semiconductor is?