Test Topics
Preparatory Course
Computer Science and Mathematics

Variables and Control Statements

• Given a script: Describe what it does and which values its variables have at the end. This includes the variables’ data type.
• Write a short script that accomplishes a simple task using if and else

Loops and Lists

• Given a script: Describe what it does and which values its variables have at the end. This includes stating the number of iterations as well as entries in a list.
• Write a short script that manipulates each item in a list using a for loop.

Trigonometry

• Given some angles or side lengths. Calculate other side lengths or other angles in a right triangle.

Functions

• Sketch a function plot by calculating a few points and drawing the connections.
• Tell if a function is bijective, surjective injective, monotonically increasing/decreasing.
• Translate, stretch or mirror a given function by applying the appropriate formula.

Derivatives

• Calculate the derivative of a function. Use multiplication, division or chain rule if applicable.
• Calculate the position of local extrema of a function given its derivative.

Integration

• Calculate the area under a function curve in a given boundary. The anti-derivative will either be given or can be calculated using the reverse exponent rule.

Differential Equations

• Locate attractor and repellor points in a given phase plot \((f'(x) \text{ vs. } f(x))\).
• Calculate an Euler approximation of a differential equation for a few number of times with a given step size and starting value.