**Scientific Investigations Using Computation: ICA (In-Class Assessment) 1**

**(28 September 2023)**

**Name/Pledged\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**In class: No open notes, nor use of computer/web resources**

**After: Any resources you choose, including office hours. Submit as PDF by 6 pm Monday 2 October.**

1. We have asserted since the first class that almost any description of modern science can be simplified down to three inter-related actions of the human person. What are they?
2. Consider a quadratic function in the form: ***y(x) = 3(x-2)2 + 4***
   1. Sketch the main features of this function near its vertex

Chart

Description automatically generated

* 1. If this ***same function*** were written in the form: ***y(x) = ax2 + bx + c***

what are ***a, b,*** and ***c***?

1. A model that has at least one element of randomness can be described as:

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1. A model whose behavior depends solely on its parameter values and the initial conditions, yielding the same result each time, can be described as

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1. For the purposes of this course, define “investigation.” Where does the word “investigation” come from?
2. List at least five characteristics that could transform an “investigation” into a “***scientific*** ***investigation***”?
3. What are some of the uses of computation that we have used already –especially in lab– to facilitate a scientific investigation? Give at least one specific example for each one you list.
4. Consider a dataset from an experiment of a large number (N) of independent observations. In words, briefly describe what each of the following ***measures*** or ***predicts*** with respect to that dataset:
   1. Average
   2. Standard Deviation
   3. Standard Error
5. (***non-graded***) The course has now completed its first third or so.
   1. What are some things –new to you– that you have learned so far?
   2. What are some things that you would like to learn before the course is over?