Quiz 1

1. **Question**

   ESSAY 2 points 0 penalty editor

   Check whether any integer between 1 and 100 follow the equation $x^5 - 45x^4 + 810x^3 - 7290x^2 + 32805x - 59049 = 0$. If yes, find that integer.

   Notes for grader:

2. **Question**

   ESSAY 2 points 0.10 penalty editor

   Write at most two line code that store the numerical values of the following in a vector:

   $$4^3 + \frac{1}{\sin^2(5)}, 5^3 + \frac{1}{\sin^2(6)}, \ldots, 97^3 + \frac{1}{\sin^2(98)}$$

   Notes for grader:

3. **Question**

   ESSAY 1 point 0 penalty editor

   Generate a vector p of length 20 that takes random values from $[-4, 4]$.

   Notes for grader:

4. **Question**

   ESSAY 1 point 0 penalty editor

   Create a sequence of length 100 starting from 7 with uniform stepsize 1.5. Now arrange the elements in reverse order.

   Notes for grader:

5. **Question**

   ESSAY 2 points 0 penalty editor

   Let A and b are the following matrices:

   $$A = \begin{pmatrix} 2 & -1 & 0 & 0 \\ -1 & 2 & -1 & 0 \\ 0 & -1 & 2 & -1 \\ 0 & 0 & -1 & 2 \\ 0 & 0 & 2 & 1 \end{pmatrix}, \; b = \begin{pmatrix} 1 \\ 0 \\ 0 \\ 1 \\ 2 \end{pmatrix}$$

Then calculate $(A^T A)^{-1}(A^T b)$.

Notes for grader:

6. **Question**

[ESSAY] [2 points] [0 penalty] [editor]

Store the following in a variable:

"This is poor coding. This must be done by Vector."

Then write codes to replace "Vector" with "James" and "poor" with "Excellent".

Notes for grader:

7. **Question:**

[MULTI] [1 point] [0 penalty] [Single] [Shuffle]

Suppose m and n are integers. Then which of the following is the output of: seq(m,n) ?

(a) [1] 1 1 1
(b) [1] 1 4 8 16
(c) [1] 5 4 3 (100%)
(d) [1] 0.2 0.4 0.8 1.0

8. **Question:**

[MULTI] [1 point] [0 penalty] [Single] [Shuffle]

What is the dimension of the following matrix M?

M <- matrix(runif(20, min = 0, max = 1), nrow = 4)

(a) 4×5 (100%)
(b) $4 \times 4 \times 20$
(c) 5×4
(d) 4×4

Total of marks: 12