Math 350 Midterm 1

Name: _____

The exam will consist of two components: A written portion and a computer portion.

For the computer portion of the exam, you can use Mathematica and its documentation but not our previous lectures or sets or any internet resources. Turn in the computer portion to Canvas as usual.

1. Write down Mathematica code that will produce the following output (without simply recopying the expression as written, of course!):

a. `{1024, 512, 256, 128, 64, 32, 16, 8, 4, 2, 1}`

b. `{{1, 2, 3, 4, 5}, {2, 3, 4, 5, 6}, {3, 4, 5, 6, 7}}`

2. What would result if these expressions are evaluated? (Act as Mathematica and run the code):

a. `Apply[List, x y z]`

`{x, y, z}`

b. `f[n_Integer] := If[n <= 1, n, f[n-1](1 + f[n-2])];`
   `f /@ Range@6`

`{1, 1, 2, 4, 12, 60}`

c. `Count[Range@15, x_ /; PrimeQ[x] && PrimeQ[x+4]]`

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3. Using English sentences, describe what the following commands will do:

a. `Plus @@ Select[Fibonacci@Range@100, EvenQ]`

b. `Cases[Tuples[{0, 1}, 10], {___, 1, _, _, _, 1, ___}]`

4. Write down Mathematica commands that will output the following:

   a. The largest value of $\cos n$ where $1 \leq n \leq 100$.

   b. A graphic depicting a square with vertices $(0,0), (0,1), (1,1), (1,0)$ in $\mathbb{R}^2$.