Embedded random polygons

Given $n = 10$ regular polygon, choose m vertices at random *with* replacement. What is the probability that the inscribed polygon with m vertices is not degenerate (i.e., actually has m vertices)

Part 1: Write a simulation to estimate the probability

Here is the function signature:

```
def est_prob(n:int, m:int, niter:int=100)->float:
    '''
    :param n: num sides in regular polygon (n>=4)
    :type n: int
    :param m: num vertices for inscribed polygon (m>=3)
    :type m: int
    :param niter: num iterations for simulation
    :type m: int
    '''
```

Naturally, the return value must be in the unit interval.

Part 2: Write a function to return numerical (i.e., not simulated) solution

Additionally, what is the probability that the non-degenerate inscribed polygon is equilateral? Note that `equilateral=True` means that you want to estimate the probability of a non-degenerate **equilateral** inscribed polygon.

Here is the function signature

```
def get_prob_shape(n:int, m:int, equilateral:bool=False)->float:
    '''
    :param n: num sides in regular polygon (n>=4)
    :type n: int
    :param m: num vertices for inscribed polygon (m>=3)
    :type m: int
    '''
```

Hints

- Test cases may use large values for n and m so beware autograder timeouts.
- You can use `numpy`, `pandas`
- Both functions should return approximately equal solutions for the same inputs in the non-equilateral case.

Please put your Python code in a Python script file and upload it. Please retain your submitted source files! Remember to use all the best practices we discussed in class. You can use any module in the Python standard library, but third-party modules (e.g., Numpy, Pandas) are restricted to those **explicitly** mentioned in the problem description.

Tips:

- After you have submitted your file, do **not** use the browser back or reload buttons to navigate or open the page in multiple browser tabs, as this may cause your `attempts` to decrease unexpectedly. It may take up to thirty seconds for your code to be processed, so please be **patient**.
- If you find yourself back at the main page without any feedback or change in your `attempts` then it means that your code timed out or crashed in some unexpected way.
- Ensure that your development environment does not presume the existence of certain packages for the autograder. The autograder does not have anything other than the standard library and those third-party libraries **explicitly** named in the problem description.
- Do not leave extraneous statements in your code like test cases, print statements, or anything else besides what is needed to evaluate your submission because the the autograder will spend its limited time executing those lines, which may result in unexpected crashes or timeouts.

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