PS0001_sample_test
For context, currently I am a sophmore student and taking this mod last year. Last year question was similar to my seniors' qns. So I hope it will be the case too.
This test is comprising of 3 qns, with 1qn branching to 2 qns. You just need to give the ouput of what they asked and make sure you read the instructions clearly (like no space, etc.)

More tips: A lot of students in my batch said that the online IDE yields error for no reason. **TO ME**, it is not the online IDE fault. It just that error highlighting there isn't good so you may miss the error and feel like you made no error, while in fact you made it. So my 2 cents is: Don't be too confident that the IDE is wrong. Recheck and calm down. Securing 20/30 for sure give you easy A :)). Goodluck!

1. Approximate pi using this series

Let's say the summation formula go up to n.
What is the least number of n so that this approximation of pi is within 10^-5 of the real value of pi?

2. If the sequence, f(n) is given by the formula:
f(n) = f(n-1) + 2f(n-2)
for n >= 2
and
f(0) = 1
f(1) = 2

What is f(30)?
What is f(60)?

Hint: don't use recursive, use iterative instead since recursive is expensive (Unless you tweak it in some way that is unnecessary to mention it here)

3. Given the matrix A
[[1,3],
[2,-1]]

What is A^30?

Solution python code and explanation:
1. // still too lazy to code \\

2. If you were to use recursive:

```
def f(n):
  if n == 0:
    return 1
  elif n == 1:
    return 2
```

```
  return f(n-1) + 2*f(n-2)
```
Even though you can get f(30), for f(60) you will not be able to get it

Suggested solution
```
a = 1
b = 2
res = 0
// 60+1 because I want to iterate until i = 60
for i in range(2, 60+1):
  res = a + b
  a,b = b, res
print(res)
```

to check, you can replace 60+1 to 30+1 and check using recursive to get f(300. If you still get the same answer thats alr correct :))

3. This one is matrix multiplication. If you are not familiar with matrix multiplication, google it :))

Notice that if you have matrix A and B, its entry is given by:
(only demonstrate A)
A =
[[A[0][0], A[0][1]],
[A[1][0], A[1][1]]
B =
[[B[0][0], B[0][1]],
[B[1][0], B[1][1]]

TEDIOUS INCOMING
so A*B =
[[A[0][0] * B[0][0], A[0][1] * B[1][0]], A[0][0] * B[0][1], A[0][1] * B[1][1]],
[A[1][0] * B[0][0], A[1][1] * B[1][0]], A[1][0] * B[0][1], A[1][1] * B[1][1]]]
So here is the:
Suggested solution
```
def multi(A,B):
  return [[A[0][0] * B[0][0], A[0][1] * B[1][0]], A[0][0] * B[0][1], A[0][1] * B[1][1]], [A[1][0] * B[0][0], A[1][1] * B[1][0]], A[1][0] * B[0][1], A[1][1] * B[1][1]]]

res = A
for i in range(2, 30+1):
  res = multi(res, A)
print(res)

```

Disclaimer: I do not double check what I wrote since it is easy to check for you guys :D if I have some time I'll recheck and enhance my phrasing too :))