1. The code below does not have any errors. If you run this code in SageMath, what will the output be?

```python
results = [4]
for i in srange(0, 8):
    value = results[i]
    newvalue = 2*value - 3
    results.append(newvalue)

print results
```
2. You need to write code that will iterate the function $f(x) = \frac{x^2}{10}$. It should start with an initial value of 3, iterate the function 20 times, and plot the resulting list of numbers. Choose a correct sequence of lines of code from the choices below to accomplish this.

First line:
A. values = []
B. values = [3]
C. value = 3
D. values = srange(0, 20)

Second line:
A. for n in values:
B. for n in count:
C. for n in (0, 20, 1):
D. for n in srange(20):

Third line:
A. a = values(-1)
B. a = values[n]
C. value = value^2 / 10
D. a = values[-1]

Fourth line:
A. values.append(a^2 / 10)
B. values.append(f(a))
C. results = [value]
D. results.append(value)

Fifth line:
A. list_plot(values)
B. list_plot(results)
C. list_plot(values)
D. plot(x^2 / 10, (x, 0, 20), ymin=3)
3. The following script creates a list of values of the function \( f(x) = 2x^2 \), as \( x \) ranges from 1 to 10. In other words, if you run the code below, the output is \([2, 8, 18, 32, 50, 72, 98, 128, 162, 200]\).

    results = []
    f(x) = 2*x^2
    for n in srange(1, 11):
        newvalue = f(n)
        results.append(newvalue)
    results

You need to modify this code to turn the script into a function, called `funclist`, which will take as inputs (arguments) the function \( f \) and the maximum value of \( x \) for the loop. For example, after defining this function, you could enter

    h(x) = x^3
    funclist(h, 5)

The result should be the list \([1, 8, 27, 64, 125] \).

Exactly four modifications (other than indenting) are needed to make this change. Mark up those four changes, with the proper indentation, on the original script above.
4. The goal of the code below is to define a function, called `deriv_at`, that takes as input a symbolic expression \( f \) (such as \( x^3 + 5x \)) and a number \( a \). The function should return \( f'(a) \). So, for example, if the function were called as `deriv_at(x^2, 5)`, the result should be 10. And if it were called as `7*deriv_at(x^2, 3)`, the result should be 42. However, the code below has five errors. Find all five of them, and explain how you would correct each one.

```python
var(x)
def deriv_at(f, a):
    fprime = diff(f)
    fprime.subs(x=a)
    print result
```

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5. The goal of the following code is to perform Euler’s method on the differential equation

\[ R' = \frac{R^2}{1 + R^2} - 0.2R \]

starting with an initial state of \( R = 2 \), with a time step of \( \Delta t = 0.1 \), and running for 1000 steps (so until \( t = 100 \)). It should then plot the results, with the correct times on the horizontal axis. However, the code below has six errors. Find all six of them, and explain how you would correct each one.

```python
Rprime(R) = R^2/1 + R^2 - 0.2*R
statelist = [2]
for i in srange(1000):
    current_state = statelist(i)
    change_vector = f(current_state)
    next_state = current_state + change_vector
statelist.append(next_state)
timelist = srange(0, 100, 0.1)
list_plot((timelist, statelist), plotjoined=True)
```