Question 1: Fib

The most famous recurrence relation is the one that specifies the Fibonacci sequence. The sequence is defined by the recurrence relation $F_n = F_{n-1} + F_{n-2}$. Where $F_0 = 0$ and $F_1 = 1$ are the base cases.

a) Find the third term F_3

b) Find the fourth term F_4

c) Find the fifth term F_5 (use your previous answers to help you)

d) Look at the code below. What do you think each line means? It looks surprisingly similar to the recurrence relation and the base cases above.

```
1   fib(0) = 0
2   fib(1) = 1
3   fib(n) = fib(n-1) + fib(n-2)
```

Question 2: New Pants

You have a new shirt but really need some cool pants to go along with it. The pants cost $50, and you already have $20 saved up. Lets see if you can eventually afford the pants by writing a recurrence relation to help.

a) Starting off simple. What is the base case here? What will P_0 be? Think about where we need to start from.

b) Every month we get paid $10 first. Add this to the recurrence relation P_n

c) Immediately after we get paid every month we earn 12% in interest. Add this to the recurrence relation P_n

d) We then get charged $5 for the phone bill. Add this to the recurrence relation P_n

e) Find the second term of this recurrence relation P_2

f) Look at the code below. Does it look similar to your recurrence relation?

```
new_pants(0) = 20
new_pants(n) = 1.12 * (new_pants(n-1) + 10) - 5
```

Question 3: Match the pattern

I have a sequence of numbers called a B sequence -¿ $2, 3, 6, 18, 108, 1944...$

a) The sequence has two base cases B_0 and B_1. What are these?

b) Using the last two terms can you find the next in the sequence. eg. use B_0 and B_1 to find B_2.

c) What is the general rule B_n?

d) What is the value of B_6?

e) Look at the code below. Does it look similar to your recurrence relation?

```
b_sequence(0) = 2
b_sequence(1) = 3
b_sequence(n) = b_sequence(n-1) * b_sequence(n-2)
```