Exam Group B (Solutions)

1) (34 points) Verify the following identity:

$$\sum_{a=1}^{n}(2a-1)^2 = n(2n+1)(2n-1)/3 . \tag{1}$$

- Write a VBA code for two different versions of a function depending on n, which reproduces the left hand side of equation (1). Use for this the DO ... LOOP structure. In one function use either the WHILE or the UNTIL command. In the other function use the EXIT DO command instead.

- Write a function depending on n, which reproduces the right hand side of this equation.

- Use the Excel spreadsheet to verify that all three functions give the same result. Compute the values for n=21 and n=30.

- Write down the VBA code for all three functions in the space provided below and report also the values for n=21 and n=30.

```
Function SUMB1(n)                                              [13]
    a = 1
    Do Until a = n + 1    or     Do While a < n + 1
        SUMB1 = SUMB1 + (2 * a - 1) ^2
        a = a + 1
    Loop
End Function
Function SUMB2(n)                                              [13]
    a = 1
    Do
        SUMB2 = SUMB2 + (2 * a - 1) ^2
        If a = n Then Exit Do
        a = a + 1
    Loop
End Function
Function RHSB(n)                                                [4]
    RHSB = n * (2 * n + 1) * (2 * n - 1) / 3
End Function
```

For n=21 the function gives 12341 and for n=30 the function gives 35990.   [4]

---

2) (30 points) Use the Excel spreadsheet to record a Macro. When your Macro is activated it should fill the cells C4 to E6 of your worksheet with the colour red and the cells F7 to I9 of your worksheet with blue. Call your Macro "Redblue" and design it such that it can be activated with Ctrl + r.

- View the VBA code of the recording you have produced and write down the VBA code in the space provided below. Write down also the comments the Macro recorder produces.

```
Sub RedBlue()
'
' RedBlue Macro
' fill C4 to E6 red and F7 to I9 with blue                          8
'
' Keyboard Shortcut: Ctrl+r
'
    Range("C4:E6").Select                                          11
    With Selection.Interior
        .ColorIndex = 3
        .Pattern = xlSolid
    End With
    Range("F7:I9").Select                                         11
    With Selection.Interior
        .ColorIndex = 5
        .Pattern = xlSolid
    End With
End Sub
```

2

3) (36 points) Write a VBA code for a function (routine) which simulates the input dialog for a cashpoint machine.

- When executed the function should start with an Input Box which states "Enter PIN number!". The title of this box should be "Welcome to City Bank".
- The entry into the input box should be assigned to an variable named "PIN". Declare the type of this variable appropriately.
- The PIN number is suppossed to be 9009. Design two message boxes with just an OK button both entitled "City Bank". If the PIN number is typed correctly into the input box, the message box should say "Sorry, no credit!", otherwise it should say "Sorry, wrong PIN number".
- Write down the VBA code in the space provided below.

```
Sub Cashpoint()
  Dim PIN As Integer      2
 10 PIN = InputBox(Prompt:="Enter PIN number!", Title:="Welcome to City Bank")
    If PIN = 9009 Then        4
 10 MsgBox Prompt:="Sorry, no credit!",Buttons:=6,Title:="City Bank"
    Else
 10 MsgBox Prompt:="Sorry, wrong PIN number",Buttons:=6,Title:="City Bank"
    End If
End Sub
```