Exam Group A (Solutions)

1) (34 points) Verify the following identity:

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

- 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 VBA code for 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 SUMA1(n) $\boxed{13}$

```
    a = 1
    Do Until a = n + 1    or      Do While a < n + 1
        SUMA1 = SUMA1 + (2 * a) ^2
        a = a + 1
    Loop
End Function
```

Function SUMA2(n) $\boxed{13}$
```
    a = 1
    Do
        SUMA2 = SUMA2 + (2 * a) ^2
        If a = n Then Exit Do
        a = a + 1
    Loop
End Function
```
Function RHSA(n) $\boxed{4}$
```
    RHSA = 2 * n * (n + 1) * (2 * n + 1) / 3
End Function
```
For n=21 the function gives 13244 and for n=30 the function gives 37820. $\boxed{4}$

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2) (30 points) Use the Excel spreadsheet to record a Macro. When your Macro is activated it should fill the cells B8 to D10 of your worksheet with the colour yellow and the cells F4 to I6 of your worksheet with black. Call your Macro "YellowBlack" and design it such that it can be activated with Ctrl + y.

- 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 YellowBlack()
'
' YellowBlack Macro                                                    8
' fill B8 to D10 yellow and F4 to I6 black
'
' Keyboard Shortcut: Ctrl+y
'
    Range("B8:D10").Select                                            11
    With Selection.Interior
        .ColorIndex = 6
        .Pattern = xlSolid
    End With
    Range("F4:I6").Select                                             11
    With Selection.Interior
        .ColorIndex = 1
        .Pattern = xlSolid
    End With
End Sub
```

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3) (36 points) Write a VBA code for a function (routine) which simulates the login dialog into a computer.

- When executed the function should start with an Input Box which states "Enter your password!". The title of this box should be "Welcome to City Computing".

- The entry into the input box should be assigned to a variable named "PASS". Declare the type of this variable appropriately.

- The PASS word is suppossed to be city2004. Design two message boxes with just an OK button both entitled "City Computing". If the PASS word is typed correctly into the input box, the message box should say "You have new e-mail!", otherwise it should say "Sorry, wrong password".

- Write down the VBA code in the space provided below.

Sub Login()

  Dim PASS As String $\boxed{2}$

$\boxed{10}$ PASS = InputBox(Prompt:="Enter your password!", Title:="Welcome to City Computing")

  If PASS = "city2004" Then $\boxed{4}$

$\boxed{10}$ MsgBox Prompt:="You have new e-mail!", Buttons:=0, Title:="City Computing"

  Else

$\boxed{10}$ MsgBox Prompt:="Sorry, wrong password", Buttons:=0, Title:="City Computing"

  End If

End Sub