Discrete Structure

①

a) $1 \times 1! \overset{?}{=} (n+1)! - 1$ for $n=1$

$1! = (2)! - 1 \rightarrow 1 = 2 - 1$ true ✓

b) $(n+1)! - 1 + (n+1).(n+1)! = (n+2)! - 1$

$(n+1)! + (n+1).(n+1)! = (n+2)!$

$(n+1)! \,(1 + (n+1)) = (n+2)!$

$(n+1)!.(n+2) = (n+2)(n+1)!$ true ✓

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② a) $g: \{(75,7), (45,4), (90,8), (70,6), (65,6), (80,7), (53,5), (86,8)\}$

$g \circ f: \{(1001,7), (1002,4), (1013,8), (1015,6), (1016,6), (1021,7), (1023,5), (1030,8)\}$

b) $\boxed{\text{YES}}$

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③ $x_n = 0, 1, 1, 3, 5, 11, 21$ I saw that 'An' approximately $(x_n)^2$ I tried that $(21)^2 + c = 401$

$A_n = 2, 1, 1, 5, 17, 101, 401$ $\boxed{c = -2x_n + 2}$ $\boxed{441 + c = 401}$

a) $0, 1, 1, 3, 5, 11, 21$

b) $A_n = (x_n)^2 - 2x_n + 2$

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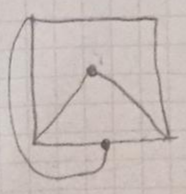
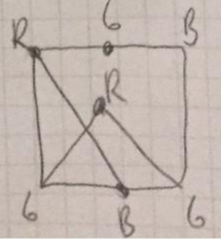
④ a) connections : $a=3, b=2, c=2, d=3, e=2, f=2, g=3$ (6)

$1=3, 2=2, 3=2, 4=2, 5=3, 6=3, 7=3$ $\boxed{\text{both of the same}}$

b) 

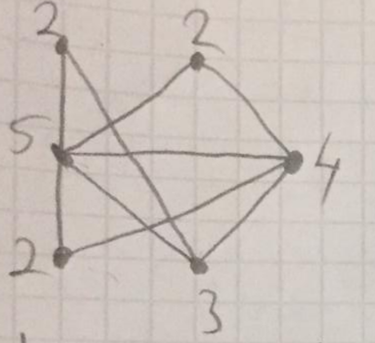
it's planar graph

c) 

B = Blue
G = green
R = Red

$\boxed{3}$

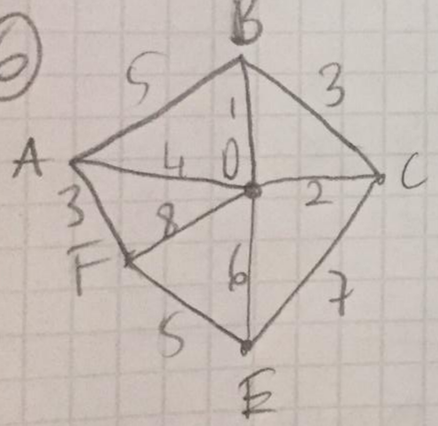
5.



- If there are (2 or 0) odd degree it is an (Euler path)
- If all of the degrees are even it is an (euler graph) (euler path and cycle

Euler circuit = No Euler path = Yes

6.



F-A-D-B-C-E-F = $\boxed{23}$