# Homework 11

CMPSC 360

Kinner Parikh

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**Question 1**:

a) How many edges are there in a graph with 10 vertices, each having a degree 3? — **15**
b) How many edges are there in a graph with 8 vertices, having a degree 1,1,2,2,3,3,3,3 respectively? — **9**
c) How many vertices are there in a graph with 19 edges, having 3 vertices of degree 4 and all the other vertices are of degree 2? — **13**

**Question 2**:

With repetition: $6! = 720$
Without repetition: $\frac{6!}{2} = 360$

**Question 3**:

a) $\frac{10!}{2!} = 1814400$
b) $\frac{8!}{2!} \cdot 5! = 2419200$
c) $\frac{10!}{2!} \cdot 2 \cdot 7 = 10! \cdot 7 = 25401600$

**Question 4**:

${}_2C_1 \cdot {}_5C_2 + {}_2C_2 \cdot {}_5C_1 = 25$

**Question 5**:

$4^3 - 1 = 63$

**Question 6**:

No

**Question 7**:

**Question 8**:

The five cases are: $x_2 = \{0, 1, 2, 3, 4\}$
When $x_2 = 0$
$x_1 + x_3 + x_4 = 10$, so ${}_{12}C_2$
When $x_2 = 1$
$x_1 + x_3 + x_4 = 9$, so ${}_{11}C_2$
When $x_2 = 2$
$x_1 + x_3 + x_4 = 8$, so ${}_{10}C_2$
When $x_2 = 3$
$x_1 + x_3 + x_4 = 7$, so ${}_{9}C_2$
When $x_2 = 4$
$x_1 + x_3 + x_4 = 6$, so ${}_{8}C_2$
So, ${}_{12}C_2 + {}_{11}C_2 + {}_{10}C_2 + {}_{9}C_2 + {}_{8}C_2 = 230$

**Question 9**:

${}_4C_0 \cdot 3^0 \cdot (2x)^4 + {}_4C_1 \cdot 3^1 \cdot (2x)^3 + {}_4C_2 \cdot 3^2 \cdot (2x)^2 + {}_4C_3 \cdot 3^3 \cdot (2x)^1 + {}_4C_4 \cdot 3^4 \cdot (2x)^0$
$= 16x^4 + 96x^3 + 216x^2 + 216x + 81$

**Question 14**:

$\lfloor \frac{10000}{3} \rfloor + \lfloor \frac{10000}{5} \rfloor + \lfloor \frac{10000}{7} \rfloor + \lfloor \frac{10000}{11} \rfloor - \lfloor \frac{10000}{15} \rfloor - \lfloor \frac{10000}{21} \rfloor - \lfloor \frac{10000}{33} \rfloor - \lfloor \frac{10000}{35} \rfloor - \lfloor \frac{10000}{55} \rfloor - \lfloor \frac{10000}{33} \rfloor$
$- \lfloor \frac{10000}{105} \rfloor - \lfloor \frac{10000}{165} \rfloor - \lfloor \frac{10000}{231} \rfloor - \lfloor \frac{10000}{385} \rfloor - \lfloor \frac{10000}{1155} \rfloor = 5485$

**Question 15**:

${}_{20}P_{15} = \frac{20!}{15!} = 1860480$

**Question 16**:

${}_6P_3 + {}_6P_2 = 120 + 30 = 150$
${}_7P_2 + 6 + 6 = 42 + 12 = 54$
So in total, they can watch $150 + 54 =$ <u>204 movies</u>