Assignment 1: CSE230

1. What is the coefficient of x^{47} is the expansion of $(2x^3+\frac{1}{x})^{29}$? [if the answer has a form like $29C_a * b^k$, what is the value of $(a+b+k)$?

2. The 3rd term in the expansion of $(y^2+2/y)^{21}$ and the 3rd term in the expansion of $(y+\frac{1}{3})^{37}$ are equal. What is the value of y? [Give the answer in fractional form]

3. What is the coefficient of z^4 in the expansion of $(z^3+3z+1)^6$?

4. What is the coefficient of $a^5b^3c^2$ in the expansion of $(370a+285b+99c)^{11}$?

5. 3 **Baltic** countries(Lithuania, Latvia, Estonia) and 5 **Scandinavian** countries (Finland, Sweden, Denmark, Iceland, Norway) belong to Europe according to their geographic location. And there are 3 countries (US, Canada and Mexico), known as **North American** countries. You have been given an opportunity to travel to exactly 3 countries among the mentioned countries above. How many ways can you make a choice of 3 countries so that there remains at least 1 scandinavian country in your chosen country list ?[The answer should be given in integer format.]

6. Trump, Kim, Putin, Modi, Imran and Justin (total 6 leaders) are sitting in linear fashion during a session of the United Nations' General Assembly. It is known that if any two of Trump, Kim and Putin sit beside each other the session may end up in a disaster. In how many ways can they sit so that the session may NOT end in a disaster (i.e. how many ways can they sit so that none of Trump, Kim or Putin sits adjacent to each other)? [The answer should be given in integral form]

7. How many 5-digit numbers are there in which three of the digits are 6, or two of the digits are 9 ? [Hint: An idea from SET THEORY can help]

8. Express the following set into Set Builder method:
    $\{\frac{1}{4}, \frac{2}{10}, \frac{4}{28}, \frac{8}{82}, \frac{16}{244}, \frac{32}{730}\}$

9. Find the domain of the following function:
    $f(x) = \frac{(x-2)\times\sqrt{25-x^2}\times ln(x+3)}{(2x+5)}$

10. Determine with proof whether $f(g(x))$ is injective or not.
$f : R \to R \quad f(x) = 4x - 5 \ , \ g : R \to R \quad g(x) = 7x^2 + 1$

11. Suppose Alice, Bob, Carol and David are playing a game together.
First, Alice writes a random number on paper and passes it to Bob.
Then, Bob multiplies the number by 9 and passes it to Carol.
Carol divides Bob's number by (5 + 3 × Alice's number) and passes it to
David. Finally, David has to determine what Alice wrote on the paper initially
from the number he gets from Carol. Is it possible for David to determine Alice's
number if the number he gets from Carol is 3 ? Justify your answer.