Department of Computer Science and Engineering
Brac University
CSE230: Discrete Mathematics
Assignment 03: Binomial

1. Find the coefficient of $x^8 y^9$ in the expansion of $(3x^2 - 2y^3)^7$.
2. Find the coefficient of $x^6 y^6$ in the expansion of $(4x^2 - y^3)^5$
3. Given equation: $a^2 = 10a - 21$, where a is an integer. Find out all the possible values of a from the equation.
4. If a < 4, show that, the (a + 2)-th term in the expansion of $(5x + 1/a^x)^8$ is a constant.
5. Given expression: $a^5(b - 3a)^{12}$
   - If the coefficient of a^8 in the given expression is -5940, then what is the value of b where a, b > 0 and a, b Ɛ R??
   - Find the value of a, if the 5th term of the expression $a^5(b - 3a)^{12}$ is equal to 120285? [use the value of b from the previous question]
6. Given expression: $(Ax - 4y^2)^7$
   - If the coefficient of $x^2 2y^{10}$ if the given expression is -86016, then what is the value of A where x, y > 0 and x, y Ɛ R?
   - Find the 2nd last term of $(Ax - 4y^2)^{13}$ using the binomial r-th term formula? [Use the value of A from the previous question]
   - Solve the following multinomial expansion problems:
     - Find the constant term in the expansion of $\left(2z^2 - 1 + \frac{2}{z^2}\right)^7$.
     - Find the constant term in the expansion of $\left(3z - 5 + \frac{1}{2z}\right)^7$.
     - Find the constant term in the expansion of $\left(4p^2 - p^3 + \frac{6}{p^3}\right)^{10}$.
     - Find the constant term in the expansion of $\left(3p^3 - 2p^2 + \frac{5}{p^5}\right)^{10}$.
     - Find the constant term in the expansion of $\left(5x + \frac{3}{y} + \frac{4}{x} + \frac{5}{7}y\right)^8$.
     - What is the coefficient of the term independent of x and y in the multinomial expansion of $(5x + \frac{3}{y} + \frac{4}{x} + \frac{5}{7}y)^8$?
     - How many terms are there in the expansion of $(2a - 3b + 4c - d)^{14}$? What is the coefficient of the term that contains $a^{p+1}b^{q+1}c^{r-2}d^{s+2}$ in that expansion if $3p = 2q = r + 2 = s + 1$?
     - How many terms are there in the expansion of $(2a - 3b + 4c - d)^{14}$? What is the coefficient of the term that contains $a^{p-1}b^{q+1}c^{r-2}d^{s+2}$ in that expansion if $2p = 3q = r + 1 = s + 2$?

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(Write all the answers on paper, then scan and make a pdf. Submit the pdf only. Naming format: Name_ID)
Submission link: ***HERE***