HW4

(Due 5:00pm, Thursday, November 19, 2026, on WyoCourses)

> See the syllabus for expectations regarding homework submissions. In particular, you are reminded that while discussion with other students is encouraged, your submissions must be your own work, not copied from any other sources, human or otherwise. You are also reminded that organization, presentation and clarity of solutions are all considered; proper notation, spelling, grammar, vocabulary and punctuation are required.

Determine each of the following using methods explained in class, and showing your work clearly. *Give exact answers only, not approximations.*

1. *(10 points)* I have 6 different used books written by my favorite author. How many ways can I distribute them to 10 students
   (a) if no student receives more than one book?
   (b) without limiting the number of different books each student receives?

2. *(10 points)* I have 6 identical silver coins. How many ways can I distribute them to 10 students
   (a) if no student receives more than one coin?
   (b) without limiting the number of different coins each student receives?

3. *(20 points)* A password of length 8 characters must be chosen over an alphabet consisting of the 26 lower case Roman letters '`a`', '`b`', ..., '`z`'. How many possible choices of password of length 8 are possible
   (a) with no further restriction on the characters?
   (b) if no letter may be repeated (e.g. '`wethuyj`' is permitted, but not '`wethuej`')?
   (c) if the 8 letters must be distinct, and they must appear in alphabetical order (e.g. '`beghimoy`' is acceptable, but '`bergtuvy`' is unacceptable)?
   (d) if letters can be repeated, but they must never appear in reverse alphabetical order? (For example, '`bddkrrru`' is acceptable, but '`cebeggmn`' is unacceptable.)

4. *(10 points)* How many ten-letter words can be formed by permuting the letters of
   (a) '`bankruptcy`'?
   (b) '`statistics`'?

   As usual, a 'word' is just a string of letters, not necessarily an English word.

5. *(15 points)* In the expansion of

$$(a+b+c+d+e)^{12} = a^{12} + 12a^{11}b + \cdots + 110880a^3b^5de^3 + \cdots + e^{12},$$

we say that 110880 is the *coefficient* of $a^3b^5de^3$. (The term $110880a^3b^5de^3$ only counts as one term in this sum.)

(a) What is the exact coefficient of $ab^4c^2e^5$ in this expansion?

(b) How many different terms are in this expansion?

(c) What is the *sum* of all the coefficients in this expansion?