

Combinatorics to Probability

- a. The Binomial Theorem and Pascal's Triangle,
- b. The Traveling Salesmen Problem,
- c. Mendel's Laws, and
- d. The Law of Addition and the Law of Multiplication.

Problem 1:

Consider the following hypothetical tables of joint segregation below.

- a) Does Table 1 suggest dependence or independence between the flower color and the pollen shape? Explain. (25%)
- b) Does Table 2 suggest dependence or independence between the flower color and the pollen shape? Explain. (25%)

Table 1

		Flower Color		
		Purple Flowers	Red Flowers	Total
Pollen Shape	Long Pollen	900	300	1200
	Round Pollen	300	100	400
	Total	1200	400	1600

Table 2

		Flower Color		
		Purple Flowers	Red Flowers	Total
Pollen Shape	Long Pollen	960	320	1280
	Round Pollen	240	80	320
	Total	1200	400	1600

Problem 2:

Consider the throw of a die, and define event A to be getting a number that is divisible by 3, and event B to be getting a number that is divisible by 6.

- a) Prepare a table of the expected joint segregation of events A and B. (20%)
- b) Are events A and B mutually exclusive?
Explain by using the table of Problem 2(a). (15%)
- c) Are events A and B independent?
Explain by using the table of Problem 2(a). (15%)