Quick Questions 8 Probability Part II Multiplication Rules

I. Place the letter of the appropriate definition or formula next to the concept it defines.

1. General rule for multiplication		A. P(A and B) = P(A) x P(B)
2. Independent events		B. Marginal probability
3. Special rule for multiplication		C. P(A and B)
4. P(A)		D. Event A does not affect the probability of event B
5. Counting rule		E. P(A and B) = P(A) × P(B I A)
6. Combination rule		F. $P(A) \times P(B/A) + P(\tilde{A}) \times P(B/\tilde{A})$
7. Joint probability		G. (M)(N)
8. Denominator of Bayes' theorem		H. N items can be arranged N! ways
9. Factorial rule		I. $\frac{N!}{(N-R)!}$
10. Permutation rule		J. $\frac{N!}{(N-R)!(R!)}$

Note that G represents how two sets of items can be ordered and H, I, and J represent how one set of items can be ordered.

II. Complete this chart concerning the number of hours students studied for a test and their exam grades.

Hours studying / **Test score**	Less than 4	Greater than or equal to 4	Total
Less than 85		2	10
Greater than or equal to 85	2		
Totals		10	

III. Use a formula and the data in question II to answer the following questions.

A. The probability of earning a grade less than 85.

B. The probability of someone studying 4 or more hours and earning a grade of 85 or higher.

C. Was the special rule of multiplication applicable to question B? Why or why not?

D. Use Bayes' theorem to calculate the probability of someone scoring 85 or higher if they studied 4 or more hours.

E. Prove your answer to question D using the chart on page 50.

IV. How many stores will a salesperson visit if they must visit 3 locations in each of 4 cities?

V. An advertising manager has 6 advertisements of equal size to place horizontally across a magazine page.

A. How many ways can the 6 ads be arranged?

B. How many ways can 4 of the 6 ads be arranged if order counts?

C. How many ways can 4 of the 6 ads be arranged if order does not count and a, b, c, d and d, c, b, a are considered the same arrangement?