



Class 8  
Permutations & Combinations  
Examples

MaxGMAT

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1. Six flights are scheduled from city A to B and then back from B to A. In how many ways a person can go to B from A and then return to A if he doesn't take the same flight for his return journey.  
(A) 30                      (B) 40                      (C) 36                      (D) 20                      (E) 24
  
  2. How many three digit numbers can be made out of all the numbers from 1 to 9 without repeating any number?  
(A) 405                      (B) 504                      (C) 84                      (D) 963                      (E) 364
  
  3. In how many ways can the letters of the word "COMPUTER" be arranged?
    - 1] Without any restriction.
    - 2] M must always occur at the third place.
    - 3] All the vowels are together.
    - 4] All the vowels are never together.
    - 5] Vowels occupy the even positions.



4. In how many ways can the letters of the word "MISSISSIPPI" be arranged?  
(A) 1260            (B) 12000            (C) 12600            (D) 14800            (E) 26800
5. In how many ways a three digit number can be written using all the digits from 1 to 9 with repetition of any digit?  
(A)  $3^9$             (B)  ${}^9C_3$             (C)  ${}^9P_3$             (D)  $9^3$             (E)  $9!$
6. In how many ways 5 people can sit around a circular table:  
1] without any restriction.  
2] one should not have the same neighbours in any two arrangements.
7. In how many ways can a committee of 4 be formed out of 8 people?  
(A) 140            (B) 60            (C) 70            (D) 72            (E) 42
8. There 6 questions in a question paper. In how many ways can a student solve one or more questions?  
(A) 6            (B) 12            (C) 63            (D) 64            (E) 65



9. There are 4 copies of 5 different books. In how many ways can they be arranged on a shelf?
- (A)  $\frac{20!}{4!}$       (B)  $\frac{20!}{5(4!)}$       (C)  $\frac{20!}{(4!)^5}$       (D)  $20!$       (E)  $5!$
10. In how many ways a committee of 2 boys and 3 girls can be made out of 5 boys and 6 girls?
- (A) 2400      (B) 400      (C) 300      (D) 200      (E) 100

**DIRECTIONS for Data Sufficiency questions: Each of the data sufficiency problems below consists of a question and two statements, labeled (1) and (2), in which certain data are given. You have to decide whether the data given in the statements are sufficient for answering the question. Using the data given in the statements plus your knowledge of mathematics and everyday facts (such as the number of days in July or the meaning of counterclockwise), you are to blacken space.**

- (A) if statement (1) **BY ITSELF** is sufficient;  
(B) if statement (2) **BY ITSELF** is sufficient;  
(C) if statements (1) and (2) **TAKEN TOGETHER** are sufficient;  
(D) if **EITHER** statement by **ITSELF** is sufficient;  
(E) if (1) and (2) **TOGETHER** are **NOT SUFFICIENT**.

11. A committee of four is chosen from a group of seven children. Will at least one of the girls be selected?
- I. The group has 4 boys and 3 girls.  
II. The group has 3 boys and 4 girls.



12. How many  $m$  digit numbers can be formed using  $n$  distinct digits?
- $m = 3$  and  $n = 5$
  - $n = 2m$
13. In how many ways can four people A, B, C and D be seated so that B and C are always together?
- A, B, C and D are to be seated in a row.
  - A, B, C and D are to be seated around a circular table.
14. How many triangles can be formed using 8 points in the given plane?
- A triangle is formed by joining 3 distinct points in the plane.
  - Out of the 8 given points 3 are collinear.
15. What is the value of  ${}^n C_r$  if the value of  ${}^n C_3 = 56$ ?
- $n - r = 3$
  - $r = 3$





Questions: 15

Time: 15 minutes

***DIRECTIONS for Problem Solving questions:*** Solve each problem, using any available space on the page for scratchwork. Then indicate the best of the answer choices given.

***Numbers:*** All numbers used are real numbers.

***Figures:*** Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that its figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.

***DIRECTIONS for Data Sufficiency questions:*** Each of the data sufficiency problems below consists of a question and two statements, labeled (1) and (2), in which certain data are given. You have to decide whether the data given in the statements are sufficient for answering the question. Using the data given in the statements plus your knowledge of mathematics and everyday facts (such as the number of days in July or the meaning of counterclockwise), you are to blacken space.

- (A) if statement (1) BY ITSELF is sufficient;
- (B) if statement (2) BY ITSELF is sufficient;
- (C) if statements (1) and (2) TAKEN TOGETHER are sufficient;
- (D) if EITHER statement by ITSELF is sufficient;
- (E) if (1) and (2) TOGETHER are NOT SUFFICIENT.

***Numbers:*** All numbers used are real numbers.

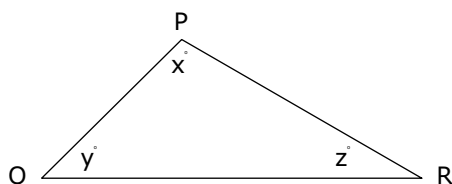
***Figures:*** A figure in a data sufficiency problem will conform to the information given in the question, but will not necessarily conform to the additional information given in statements (1) and (2).

You may assume that lines shown as straight are straight and that angle measures are greater than zero.

You may assume that the position of points, angles, regions, etc., exist in the order shown.

All figures lie in a plane unless otherwise indicated.

Example:



In  $\triangle PQR$ , what is the value of  $x$ ?

- (1)  $PQ = PR$
- (2)  $y = 40$

Explanation:

According to statement (1),  $PQ = PR$ ; therefore,  $\triangle PQR$  is isosceles and  $y = z$ . Since  $x + y + z = 180$ ,  $x + 2y = 180$ . Since statement (1) does not give a value for  $y$ , you cannot answer the question using statement (1) by itself. According to statement (2),  $y = 40$ ; therefore,  $x + z = 140$ . Since statement (2) does not give a value for  $z$ , you cannot answer the question using statement (2) by itself. Using both statements together, you can find  $y$  and  $z$ ; therefore, you can find  $x$ , and the answer to the problem is C.



1. In how many ways can 5 rings be worn on the four fingers of the right hand?  
(A)  $3 \times 4$       (B)  ${}^5C_4$       (C)  ${}^5P_4$       (D)  $5^4$       (E)  $4^5$
2. Mary has 7 roses, 8 lilies and 10 carnations. In how many ways can a bouquet be made if she has to choose 3 roses, 5 lilies and 6 carnations?  
(A)  ${}^7C_3 \times {}^8C_6 \times {}^{10}C_5$       (B)  ${}^{25}C_{14}$       (C)  ${}^7C_3 \times {}^8C_5 \times {}^{10}C_6$   
(D)  ${}^{15}C_9 \times {}^{10}C_5$       (E)  $3 \times 5 \times 6$
3. Three Math books, four English books and four Reasoning books are kept on a shelf. In how many ways they can be arranged. So that the books of each type are always together?  
(A)  $11!$       (B)  ${}^{11}C_3$       (C) 40550      (D) 20736      (E)  ${}^{11}P_3$
4. How many 3 letter words can be constructed using all the 26 letters of the English alphabet if only the middle letter of each word is a vowel?  
(A) 2205      (B) 441      (C) 9261      (D) 2400      (E) 105
5. In how many ways can 5 identical black balls and 7 identical white balls be arranged in a row so that no 2 black balls are together?  
(A) 56      (B) 64      (C) 65      (D) 316      (E) 560
6. In how many ways can all the 7 sweets be distributed to three friends Jack, Jill and John so that Jill always gets 2 sweets and each of them gets at least one sweet.  
(A) 24      (B) 6      (C) 4      (D) 12      (E) 3
7. In how many ways can 4 men and 4 women sit at a round table with no two women in consecutive positions?  
(A) 24      (B) 72      (C) 288      (D) 144      (E) 48
8. In how many ways can one choose 6 cards from a normal deck of cards so as to have all suits present?  
(A)  $13^4 \times 48 \times 47$       (B)  $13^4 \times 24 \times 47$       (C)  ${}^{48}C_6$   
(D)  $13^4$       (E)  $13^4 \times {}^{48}C_6$
9. How many numbers greater than a thousand can be made using the following digits without repetition: 1, 0, 3, 4 and 5?  
(A)  $96^2$       (B)  $96 \times 2$       (C) 576      (D)  $(24)^2$       (E)  $24 \times 96$
10. A mocktail has to be prepared from three kinds of whiskey, 4 kinds of soda and five kinds of fruit juice. How many mocktails can be made taking at least one of each kind?  
(A) 235      (B) 325      (C) 3255      (D) 5235      (E) 565

Tick guessed questions

1.     2.     3.     4.     5.     6.     7.     8.     9.     10.



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11. What is the value of  ${}^{25}C_n$ ?
- ${}^nC_4 = {}^nC_8$
  - ${}^nC_{11} = 12$
12. Two prizes have to be given to a group of seven children of which four are girls and 3 are boys. In how many ways can the second prize can be given if the second prize has to be given to one of the girls only after giving the first prize?
- The first prize is always given to one of the boys.
  - One of the prizes must go to a boy.
13. How many three-digit numbers can be formed using four digits of the decimal system?
- All the four digits are distinct.
  - None of the four digits is zero.
14. In how many ways can  $n$  distinct objects be arranged?
- $n = 5$
  - Arrangement is linear.
15. In how many ways can distinct objects be arranged in a circle?
- There are 8 objects.
  - The radius of the circle is 7 cm.



*Tick guessed questions*

11.  12.  13.  14.  15.



### Feedback Form

### Score Sheet

	A	B	C	D	E		A	B	C	D	E	
1	0	0	0	0	0	0	8	0	0	0	0	0
2	0	0	0	0	0	0	9	0	0	0	0	0
3	0	0	0	0	0	0	10	0	0	0	0	0
4	0	0	0	0	0	0	11	0	0	0	0	0
5	0	0	0	0	0	0	12	0	0	0	0	0
6	0	0	0	0	0	0	13	0	0	0	0	0
7	0	0	0	0	0	0	14	0	0	0	0	0
							15	0	0	0	0	0

After completing the test and filling up the boxes below, tear off this strip and give it to your instructor.



### Class 8 Permutations & Combinations Class Test

Batch

Enrolment No.

1. Total number of questions: **15**

2. Number of questions attempted:

3. Correct answers:

4. Wrong answers:

5. Guessed answers:



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Answer Keys

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**SOLVED EXAMPLES**

1-A      2-B      3-\*      4-C      5-D      6-\*      7-C      8-C

9-C      10-D      11-B      12-A      13-D      14-B      15-D

**CLASS TEST**

1-E      2-C      3-D      4-A      5-A      6-C      7-D      8-B

9-B      10-C      11-D      12-D      13-C      14-C      15-A