

Brett Robbins Academic Consulting

Math 30-1 Practice Test

Permutations, Combinations & Binomial Theorem

25 Questions

Original practice questions written to the Alberta curriculum, in the style of past diploma examinations. Work through each question, then check your answers with the key at the end.

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, contact Brett for clarification.

Question 1

A multiple – choice quiz has 5 questions, and each question has 4 possible answers.

The number of different sets of answers that can be given is

- | | |
|---------|---------|
| A) 20 | B) 625 |
| C) 1024 | D) 3125 |

Question 2

Eight runners finish a race with no ties.

The number of ways the first, second, and third place medals can be awarded is

- | | |
|--------|--------|
| A) 512 | B) 56 |
| C) 24 | D) 336 |

Question 3

A student must choose 4 courses from 12 elective courses.

The number of different selections the student can make is

- | | |
|----------|--------|
| A) 11880 | B) 495 |
| C) 48 | D) 144 |

Question 4

The coefficient of the x^3 term in the expansion of $(x + 2)^5$ is

- | | |
|-------|-------|
| A) 10 | B) 20 |
| C) 40 | D) 80 |

Question 5

The number of different arrangements of all the letters in the word BANANA is

Question 6

A security code consists of 4 digits, and digits may be repeated.

If the code cannot begin with 0, the number of different codes is

- | | |
|---------|----------|
| A) 9000 | B) 10000 |
| C) 6561 | D) 5040 |

Question 7

The number of different arrangements of all the letters in the word STATISTICS is

- | | |
|------------|-----------|
| A) 3628800 | B) 604800 |
| C) 50400 | D) 100800 |

Question 8

A committee of 5 people is to be selected from 9 women and 7 men.

The number of committees that have at least 3 women is

- | | |
|---------|---------|
| A) 2772 | B) 1764 |
| C) 4368 | D) 1596 |

Question 9

Five friends are seated in a row for a photograph. Aisha and Ben must sit next to each other.

The number of different seating arrangements is

- | | |
|--------|-------|
| A) 120 | B) 48 |
| C) 24 | D) 72 |

Question 10

In the expansion of $(2x - 3)^6$, the coefficient of the x^2 term is

Question 11

A reading list of 6 books is to be chosen from 10 novels and 8 biographies.

The number of lists that contain exactly 4 novels is

- | | |
|---------|----------|
| A) 5880 | B) 18564 |
| C) 2100 | D) 2940 |

Question 12

For a team photo, 7 players stand in a line. The tallest player must stand in the middle, and the shortest player must stand at one of the two ends. The number of arrangements is

- | | |
|---------|--------|
| A) 5040 | B) 720 |
| C) 120 | D) 240 |

Question 13

Seven points are marked on the circumference of a circle, and polygons are formed by joining the points.

The number of polygons with 3 or more sides that can be formed is

- | | |
|-------|--------|
| A) 35 | B) 91 |
| C) 99 | D) 112 |

Question 14

The number of 3-digit or 4-digit PINs that can be formed using only the digits 1 to 8, with no digit repeated in a PIN, is

Question 15

The middle term in the expansion of $(x^2 - 2)^6$, written in descending powers of x , is

- | | |
|-------------|--------------|
| A) $160x^6$ | B) $-160x^6$ |
| C) $-20x^6$ | D) $60x^8$ |

Question 16

There are 11 terms in the expansion of $(x - 3)^n$.

The value of n is i , and the constant term in the expansion is ii .

A) $n = 10$

Constant term : 59049

B) $n = 11$

Constant term : 59049

C) $n = 10$

Constant term : -59049

D) $n = 9$

Constant term : 19683

Question 17

The number of arrangements of all the letters in the word BOOKKEEPER in which the three Es are together is

A) 151200

B) 20160

C) 5040

D) 10080

Question 18

In the expansion of $(x + 3)^8$, written in descending powers of x , the coefficient of the x^5 term is

Question 19

A committee of 4 people is to be selected from 8 students and 5 teachers.

The number of committees that contain at most 1 teacher is

- | | |
|--------|--------|
| A) 350 | B) 280 |
| C) 715 | D) 70 |

Question 20

Each member of a 5-member council votes yes or no on a motion.

The number of voting patterns in which the motion passes (more yes than no) is

- | | |
|-------|-------|
| A) 32 | B) 10 |
| C) 25 | D) 16 |

Question 21

Twelve students are divided into three groups of 4, and the groups are assigned to three different work stations. The number of ways this can be done is

Question 22

In the expansion of $(x + a)^n$, written in descending powers of x ,
the second term is $48x^5$ and the third term is $960x^4$. The values of a and n are

A) $a = 6$

$n = 8$

B) $a = 8$

$n = 6$

C) $a = 4$

$n = 6$

D) $a = 8$

$n = 5$

Question 23

In the expansion of $(x + 5)^{10}$, written in descending powers of x ,
the coefficient of the fourth term is

Question 24

Four girls and four boys stand in a line for a dance routine, alternating girl, boy, girl, boy, and so on.

The number of different arrangements is

A) 576

B) 40320

C) 1152

D) 288

Question 25

A display is made by choosing 4 books from 6 math books and 5 physics books.

If the display must contain at least 1 book of each type, the number of displays is

Answer Key

- | | | |
|-------|----------|-----------|
| 1. C | 10. 4860 | 19. A |
| 2. D | 11. A | 20. D |
| 3. B | 12. D | 21. 34650 |
| 4. C | 13. C | 22. B |
| 5. 60 | 14. 2016 | 23. 15000 |
| 6. A | 15. B | 24. C |
| 7. C | 16. A | 25. 310 |
| 8. A | 17. D | |
| 9. B | 18. 1512 | |

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