Practice Test
Chapter 4 – Counting Methods

Name: _____

Block: _____

Multiple Choice
Identify the choice that best completes the statement or answers the question.

_____ **1.** Eve can choose from the following notebooks:
• lined pages come in red, green, blue, and purple
• graph paper comes in orange and black

How many different colour variations can Eve choose if she needs one lined notebook and one with graph paper?

A. 6
B. 8
C. 12
D. 16

_____ **2.** A combination lock opens with the correct four-letter code. Each wheel rotates through the letters A to L. How many different four-letter codes are possible?

A. 20 736
B. 48
C. 1728
D. 456 976

_____ **3.** A restaurant offers 60 flavours of wings. How many ways can two people order two servings of wings, either the same flavour or different flavours?

A. 3481
B. 3540
C. 3600
D. 3660

_____ **4.** How many possible ways can you draw a single card from a standard deck and get an even number?

    A. 13
    B. 20
    C. 21
    D. 26

_____ **5.** Evaluate.

$$\frac{10!}{9!} + 3!$$

    A. 13
    B. 16
    C. 20
    D. 23

_____ **6.** Identify the expression that is equivalent to the following:

$$n(n+1)(n-1)$$

    A. $\dfrac{(n+1)!}{(n-2)!}$
    B. $\dfrac{(n+2)!}{(n-1)!}$
    C. n^3
    D. $(n+1)!$

_____ **7.** How many different permutations can be created when 7 people line up to buy movie tickets?

    A. 49
    B. 128
    C. 720
    D. 5040

_____ **8.** Evaluate.

$$_{14}P_7$$

    A. 17 297 280
    B. 2 162 160
    C. 121 080 960
    D. 105 413 504

_____ **9.** Suppose a word is any string of letters. How many two-letter words can you make from the letters in LETHBRIDGE if you do not repeat any letters in the word?

    A. 72
    B. 100
    C. 81
    D. 90

_____ **10.** How many numbers are there from 1000 to 1999 that do not have any repeated digits?

    A. 504
    B. 1000
    C. 888
    D. 776

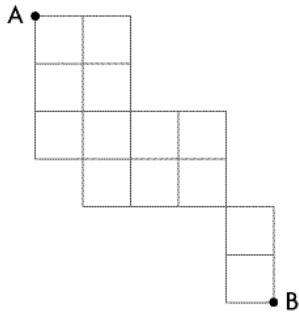_____ **11.** Solve for r.

$$_{15}P_{r-2} = 2730$$

    A. $r = 5$
    B. $r = 6$
    C. $r = 1$
    D. $r = 3$

_____ **12.** Evaluate.

$$\frac{15!}{10! \cdot 3! \cdot 2!}$$

    A. 30 030
    B. 30 300
    C. 60 060
    D. 60 600

13. How many different routes are there from A to B, if you only travel south or east?

A •

• B

    A. 128
    B. 256
    C. 156
    D. 104

14. Eight quarters are flipped simultaneously. How many ways can at least six coins land heads?

    A. 36
    B. 37
    C. 44
    D. 56

15. The numbers 10 to 16 are written on identical slips of paper and put in a hat. How many ways can 2 numbers be drawn simultaneously?

    A. 21
    B. 15
    C. 30
    D. 42

_____ **16.** Identify the term that best describes the following situation:
Determine the number of pizzas with 4 different toppings from a list of 40 toppings.

    A. permutations
    B. combinations
    C. factorial
    D. none of the above

Short Answer

17. The "Pita Patrol" offers these choices for each sandwich:

    • white or whole wheat pitas
    • 3 types of cheese
    • 5 types of filling
   • 12 different toppings
    • 4 types of sauce

How many different pitas can be made with 1 cheese, 1 filling, 1 topping, and no sauce?

18. Solve for n, where $n \in I$.

$$\frac{(n+1)!}{2(n-1)!} = 6$$

19. How many different arrangements can be made using all the letters in YELLOWKNIFE, if the first letter must be L and the last letter must be Y?

20. How many different routes are there from A to B, if you only travel south or east?
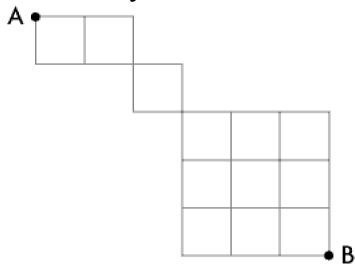
21. How many 4-person committees can be formed from a group of 8 teachers and 5 students if there must be either 1 or 2 teachers on the committee?

22. From a standard deck of 52 cards, how many different four-card hands are there with at most two diamonds?

Problem

23. Hannah plays on a local hockey team. The hockey uniform has:

   • four different sweaters: white, blue, grey, and black, and
   • two different pants: blue and grey.

   a) Draw a tree diagram to determine how many different variations of the uniform the coach can choose from for each game are possible.

   b) Confirm your answer to part a) using the Fundamental Counting Principle.

24. At a used car lot, 8 different car models are to be parked close to the street for easy viewing, but there is only space for 6 cars. How many ways can 6 of the 8 cars be parked in a row? Show your work.

25. An isogram is a word or phrase without a repeating letter.
Vito and Kira are playing a guessing game involving isograms. Kira thinks of a word with no repeating letters. She tell Vito that her word can be used to make 100 one – or two – letter phrases, without repetition. She gives A, ET, and TE as examples.

a) How many letters are in Kira's word? Show your work

b) Which of the following could be Kira's word? Explain your answer.
Switzerland   atmospheric   lumberjack   duplicate   trapezoid   juxtaposes

26. There are 18 boys and 13 girls in an English classroom. A group of 6 students is needed to read from a play. If there are 2 roles for boys, 3 roles for girls, and a narrator who could be a boy or a girl, how many different groups of 6 students are possible? Show your work.

27. Fifteen camp counselors are signing up for training courses that have only a limited number of spaces. Only 5 people can take the water safety course, 4 people can take the first aid course, 3 people can take the conflict management course, and 3 people can take the astronomy course. How many ways can the 15 counselors be placed in the four courses? Show your work.