NAME: _____ BLOCK: ____ DATE: _____

FMATH 12 - MIDTERM - PRACTICE QUESTIONS

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

1. Determine the future value of a simple interest investment with a 6-year term on a principal of $150 at 2.8%.
   A. $180.50 **C.** $402.00
   B. $175.20 **D.** $154.30

2. Determine the future value of a simple interest investment where 5% interest paid monthly for 1.5 years on $1000.
   A. $1000 **C.** $1075
   B. $1050 **D.** $1100

3. Principal of $80 is invested at 2.3% simple interest, paid annually, for 4 years. What is the rate of return?
   A. 8.9% **C.** 8.4%
   B. 9% **D.** 9.2%

4. Patrick invested $4000 for 9 years. At the investment's maturity, its value was $5476. What was the annual simple interest rate?
   A. 3.8% **C.** 6.2%
   B. 4.1% **D.** 5.3%

5. Rosa invested $600 at 3.9% simple interest. At the investment's maturity, its value was $1302. How long was the money invested?

   A. 25 years **C.** 35 years
   B. 30 years **D.** 40 years

6. Tenzin has $9000 to invest for 2 years. Which investment option will earn her more interest? How much more interest?
   A. 5% simple interest, paid quarterly
   B. 7% compound interest, paid annually

   A. Option A: $401.70
   B. Option B: $380.47
   C. Option A: $359.20
   D. Option B: $404.10

7. How many compounding periods are there for $1000 invested for 6 years at 4.2% compounded semi-annually?

   A. 6 **B.** 12 **C.** 42 **D.** 6000

8. Which line of the table shows the correct values for i and n?

Compound Interest Rate per Annum (%)	Compounding Frequency	Term	Interest Rate per Compounding Period, i (%)	Number of Compounding Periods, n
5.4	annually	3 years	0.54	3
3.0	semi-annually	18 months	0.015	3
2.4	monthly	2 years	0.001	24
3.65	daily	2 years	0.001	730

A. Line 1 **B.** Line 2 **C.** Line 3 **D.** Line 4

9. Determine the future value and the total interest earned for the investment.

Principal (P) ($)	Compound Interest Rate per Annum (%)	Compounding Frequency	Term
9000	2.25	semi-annually	3 years

A. $9728.91; $728.91
B. $9696.45; $696.45
C. $9626.65; $625.65
D. $9624.84; $624.84

10. Determine the present value of a 10-year GIC with an interest rate of 5.6%, compounded monthly, if the future value is $10 000.

A. $5769.74
B. $5719.54
C. $5662.89
D. $5744.47

11. Determine the interest earned on a 20-year investment with an interest rate of 4.25%, compounded quarterly, if the future value is $100 000.

A. $56 501.05
B. $59 741.77
C. $57 066.43
D. $58 428.18

12. A $6000 investment grows to $7351.81 in 5.5 years. If the investment has interest compounded monthly, determine the interest rate.

A. 3.7%
B. 3.5%
C. 3.3%
D. 3.2%

13. A 6-year bond has an interest rate of 4.85%, compounded quarterly, and a future value of $70 000. Determine the ratio of future value to present value.

A. 1.335
B. 1.263
C. 1.438
D. 1.294

14. Gila took out a loan from the bank to buy a new car that costs $22 500. The bank offered her a simple interest rate of 4.3%. The loan is to be repaid in 5 years. What amount did Gila need to pay back?

A. $27 771.80
B. $27 337.50
C. $23 467.50
D. $22 500.00

15. Oleg took out a $16 000 loan from the bank to pay for school. The bank offered him an interest rate of 5.6%, compounded quarterly. The loan is to be repaid in 3 years. How much interest did Oleg need to pay?

A. $2688.00
B. $2904.95
C. $2841.34
D. $2919.59

16. Carmen must now pay $9000 to pay off her bank loan, which she borrowed 10 years ago. The loan was compounded monthly at an interest rate of 5.2%. How much did Carmen originally borrow?

A. $15 121.25
B. $5421.07
C. $5356.70
D. $5921.05

17. A loan worth $10 000 is due in 5 years. Which compounding period will result in the highest amount of interest?

A. annually
B. quarterly
C. monthly
D. daily

18. Yu needs a car. He can lease a car for 3 years for $300 per month and a down payment of $4100. He can purchase a new car for $28 000, which would be financed with a bank loan at an interest rate of 5.2%, compounded monthly, and a down payment of $3700. He would pay off this loan with regular monthly payments. He can also rent a car at $75 per day. What is the total cost of leasing the car?

A. $10 800 **B.** $18 500 **C.** $14 900 **D.** $12 600

19. What is the meaning of *disjoint* in set theory?

A. two or more sets having no elements in common
B. two or more sets that do not match
C. sets that are in different universal sets
D. sets that contain no elements

20. Which pair of sets represents disjoint sets?

A. N, the set of natural numbers, and I, the set of integers
B. T, the set of all triangles, and C, the set of all circles
C. N, the set of natural numbers, and P, the set of positive integers
D. none of the above

21. Rahim described the set as follows:

- M = {all of the foods he eats}
- D = {his favourite desserts}
- V = {his favourite vegetables}
- F = {his favourite fruits}

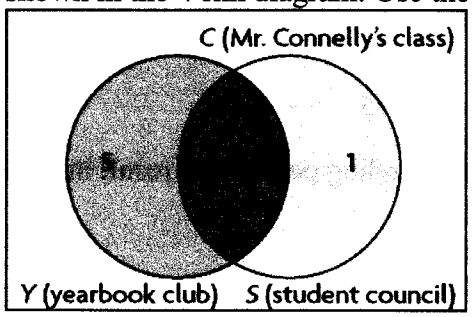
Which are the disjoint sets?

A. M and D **B.** M and V **C.** M and F **D.** V and F

22. Given the following situation: • the universal set U = {positive integers less than 20}
• X = {4, 5, 6, 7, 8} • P = {prime numbers of U} • O = {odd numbers of U}
Which set represents the odd, prime numbers of set U?

A. {0, 3, 5, 7, 11, 13, 17, 19}
B. {3, 5, 7, 11, 13, 17, 19}
C. {2, 3, 5, 7, 11, 13, 17, 19}
D. {1, 2, 3, 5, 7, 11, 13, 17, 19}

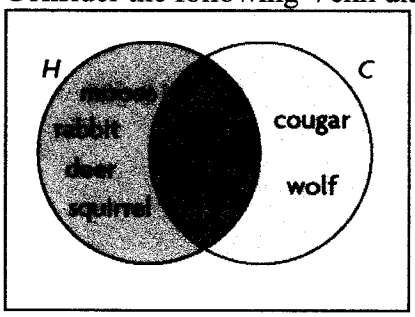
23. There are 28 students in Mr. Connelly's Grade 12 mathematics class.
The number of students in the yearbook club and the number of students on student council are shown in the Venn diagram. Use the diagram to answer the following questions.



How many students are in both the yearbook club and on the student council?

A. 2 **B.** 5 **C.** 1 **D.** 7

24. Consider the following Venn diagram of herbivores and carnivores:



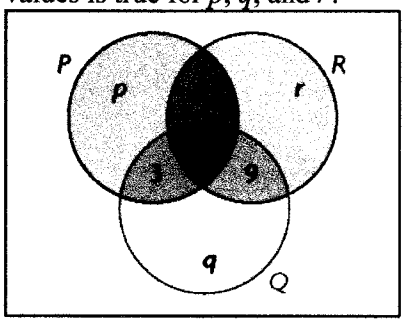
Determine $n(H \cup C)$.

A. 2 **B.** 9 **C.** 4 **D.** 3

25. Consider the following two sets:
• A = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12} • B = {–9, –6, –3, 0, 3, 6, 9, 12}
Determine $A \cap B$.

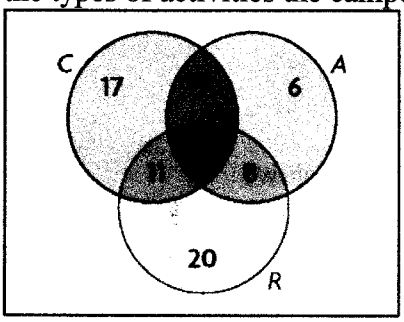
A. {3, 6, 9, 12} **B.** {0, 3, 6, 9, 12} **C.** {1, 2, 4, 5, 7, 8, 10, 11} **D.** {–9, –6, 6, 9}

26. The three circles in the Venn diagram (P, Q, and R) contain the same number of elements. Which set of values is true for p, q, and r?



A. $p = 11, q = 11, r = 5$
B. $p = 7, q = 8, r = 2$
C. $p = 7, q = 6, r = 1$
D. $p = 14, q = 13, r = 7$

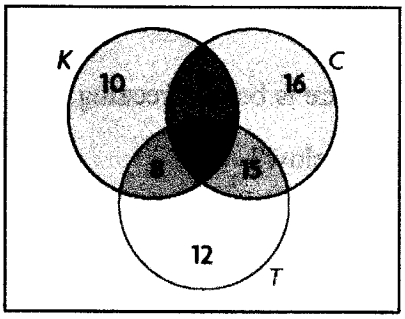
27. A summer camp offers canoeing, rock climbing, and archery. The following Venn diagram shows the types of activities the campers like.



Use the diagram to determine $n((R \cap A) \setminus C)$.

A. 14 **B.** 5 **C.** 26 **D.** 8

28. A restaurant offers Chinese, Thai, and Korean food. The following Venn diagram shows the types of food the customers like.



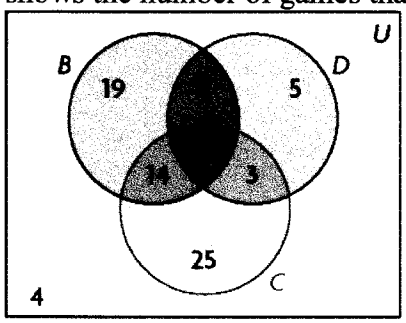
Use the diagram to determine $n(K) - n(C \cap T \cap K)$.

A. 10 **B.** 50 **C.** 27 **D.** 33

29. What is a hypothesis?

A. an idea **B.** a statement **C.** a clue **D.** an assumption

30. Some table games use a board, dice, or cards, or a combination these. The following Venn diagram shows the number of games that use these tools.



Use the diagram to determine the number of games that use exactly two of these tools.

A. 13 **B.** 51 **C.** 25 **D.** 74

31. Which sentence is written as a conditional statement?

A. You can fool some of the people some of the time but you can't fool me.
B. If you are a farmer, then you live in the country.
C. If you can't beat them, join them.
D. You get wet if you stand in the rain.

32. Which sentence is the converse to the conditional statement below?
"If the milk is not refrigerated, then it will spoil."

A. Unrefrigerated milk will spoil.
B. The milk is spoiled because it was not put in the refrigerator.
C. If the milk is spoiled, then it is not refrigerated.
D. The milk will spoil if it is not put in the refrigerator.

33. Which conditional statement is false?

A. If today is Labour Day, then it is November 3.
B. If it is October, then students are in school.
C. If today is Friday, then tomorrow is Saturday.
D. If there is deep snow outside, then the outside temperature is below freezing.

34. Which statement is the inverse of the conditional statement below?
"If tomorrow is Monday, then today is Sunday."

A. If tomorrow is Sunday, then today is not Monday.
B. If today is Sunday, then tomorrow is Monday.
C. If tomorrow is not Monday, then today is not Sunday.
D. If today is not Sunday, then tomorrow is not Monday.

35. Which statement is the inverse of the conditional statement below?
"If a bird has wings, then the bird can fly."

A. If a bird does not have wings, then the bird cannot fly.
B. If the bird cannot fly, then the bird does not have wings.
C. If a bird can fly, then the bird has wings.
D. If a bird does not have wings, then the bird can fly.

36. Eve can choose from the following notebooks:
• lined pages come in red, green, blue, and purple • coloured paper comes in orange and black
How many different colour variations can Eve choose if she needs one lined notebook and one with coloured paper?

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

37. A combination lock opens with the correct three-digit code. Each wheel rotates through the digits 1 to 8. Suppose each digit can be used only once in a code. How many different codes are possible when repetition is not allowed?

A. 21 **B.** 63 **C.** 256 **D.** 336

38. The lunch special at a sandwich bar offers you a choice of 6 sandwiches, 4 salads, 6 drinks, and 3 desserts. How many different meals are possible if you choose one item from each category?

A. 432 **B.** 576 **C.** 646 **D.** 720

39. Evaluate.
$8! + 1!$

A. 40 321 **B.** 5041 **C.** 40 123 **D.** 16 777 217

40. Identify the expression that is equivalent to the following:
$\frac{n!}{(n-2)!} + n$

A. n **B.** $-n$ **C.** n^2 **D.** n^3

41. Solve for n, where $n \in \mathrm{I}$.
$\frac{n!}{(n-1)!} = 4!$

A. 8 **B.** 16 **C.** 24 **D.** 32

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

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

43. Evaluate.
${}_3P_1$

A. 1 **B.** 2 **C.** 3 **D.** 6

44. Suppose a word is any string of letters. How many three-letter words can you make from the letters in REGINA if you do not repeat any letters in the word?

A. 20 **B.** 16 **C.** 216 **D.** 120

45. Solve for n.
${}_nP_4 = 120$

A. $n = 5$ **B.** $n = 6$ **C.** $n = 7$ **D.** $n = 8$

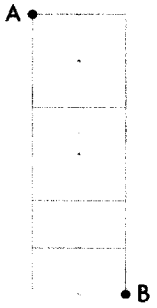
46. How many ways can 8 friends stand in a row for a photograph if Molly, Krysta, and Simone always stand together?

A. 1440 **B.** 4320 **C.** 5040 **D.** 2160

47. How many different arrangements can be made using all the letters in CANADA?

A. 120 **B.** 180 **C.** 360 **D.** 720

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



A. 16 **B.** 24 **C.** 28 **D.** 56

49. There are 14 members of a student council. How many ways can 7 of the members be chosen to serve on the dance committee?

A. 1144 **B.** 1716 **C.** 3432 **D.** 17 297 280

50. A fun fair requires 4 employees to work at the sack bar. There are 13 people available. How many ways can a group of 4 be chosen?

A. 1000 **B.** 715 **C.** 635 **D.** 808

51. Evaluate.

$\binom{4}{1}$

A. 0 **B.** 1 **C.** 4 **D.** 16

52. How many ways can 3 representatives be chosen from a soccer team of 16 players?

A. 1120 **B.** 560 **C.** 3360 **D.** 1580

53. Which of the following is equivalent to ${}_{17}C_{10}$?

A. $\binom{10}{7}$ **B.** $7!\binom{17}{7}$ **C.** $7!\binom{10}{7}$ **D.** $\binom{17}{7}$

54. Solve for n.

${}_nC_1 = 30$

A. $n = 6$ **B.** $n = 10$ **C.** $n = 30$ **D.** $n = 60$

55. How many ways can the 6 starting positions on a hockey team (1 goalie, 2 defense, 3 forwards) be filled from a team of 1 goalie, 4 defense, and 8 forwards?

A. 164 **C.** 336

B. 254 **D.** 1716