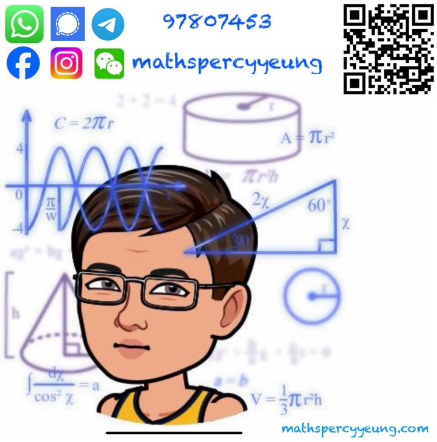
2023-2024 S1
1st TERM EXAM
MATH

2023 – 2024
S1 First Term Examination

MATHEMATICS

Question–Answer Book

4th January, 2024
10:00 am – 11:30 am (1 hour 30 minutes)
This paper must be answered in English



INSTRUCTIONS

1. Write your name, class and class number in the spaces provided on this cover.

2. Answer ALL questions in Section A. You should use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured. You should mark only ONE answer for each question. If you mark more than one answer, you will receive NO MARKS for that question.

3. Attempt ALL questions in Sections B and C. Write your answers in the spaces provided in this Question – Answer Book.

4. Unless otherwise specified, all working must be clearly shown.

5. The diagrams in this paper are not necessarily drawn to scale.

6. NO calculator is allowed.

Sections	Marks
A Total	**/30**
B Total	**/40**
C Total	**/30**
TOTAL	**/100**

Section A (30 marks)

Choose the best answer for each question.

1. $30+(25-5\times4)=$

A. 35.
B. 80.
C. 110.
D. 200.

2. Which of the following expressions have the same result?

I. $56+15-3\times6$
II. $56+(15-3)\times6$
III. $(56+15)-3\times6$

A. I and II only
B. I and III only
C. II and III only
D. I, II and III

3. The L.C.M. of $2^2\times3$, $3^2\times5^2\times7$ and $2^5\times3\times7^2$ is

A. $2^7\times3^4\times5^2\times7^2$.
B. $2^5\times3^2\times5^2\times7^2$.
C. $2\times3\times5\times7$.
D. 3×7.

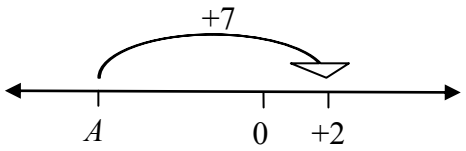
4. If $12\blacktriangle4$ is a number that is divisible by 9, find the possible value of $\blacktriangle$.

A. 0
B. 1
C. 2
D. 3

5. Which of the following is the largest prime factor of 65?

A. 1
B. 5
C. 13
D. 25

6. According to the following figure, A represents the directed number



A. -2.
B. -3.
C. -4.
D. -5.

7. Which of the following expression has a value different from the others?

A. $(-2)+(-6)$
B. $(-3)+(-5)$
C. $(-2)(+4)$
D. $\dfrac{-16}{-2}$

8. $(-3)(+3)+(+3)(-3)-(-3)=$

A. -21.
B. -15.
C. 0.
D. 3.

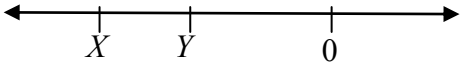
9. The following table shows the temperatures of four cities.

City	*A*	*B*	*C*	*D*
Temp(°C)	4	0	−7	−4

Which two cities have the least difference in temperature?

A. City *A* and City *B*
B. City *B* and City *C*
C. City *B* and City *D*
D. City *C* and City *D*

10. *X* and *Y* represent two directed numbers on the number line as shown.



Which of the following must be positive?

A. $1+\frac{X}{Y}$
B. $-(X)(Y)$
C. $X+Y$
D. $X-Y$

11. Simplify the algebraic expression $2\times 8x-12y+36y\div 6-9x$.

A. $7x + 4y$
B. $7x - 6y$
C. $-2x + 4y$
D. $-2x - 6y$

12. Tom is *m* years old. Kate's age is 4 less than 5 times Tom's. Find the age of Kate.

A. $4m - 5$
B. $4m + 5$
C. $5m + 4$
D. $5m - 4$

13. Use an algebraic expression to represent the word phrase 'subtract the product of *k* and 3 from 6'.

A. $6 - 3k$
B. $3k - 6$
C. $6(k - 3)$
D. $(3 - 6)k$

14. Consider the formula $G=10(M+N)$. If $G = 130$ and $N = 3$, find the value of *M*.

A. 8
B. 9
C. 10
D. 11

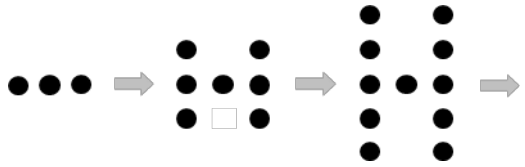
15. The total price ($*P*) of *a* apples and *b* bananas can be calculated by the formula $P = 7a + 8b$. If Samuel buys 8 apples and 3 bananas, how much should he pay?

A. $24
B. $56
C. $80
D. $85

16. Let a_n be the *n*th term of a sequence. If $a_5 = 54$ and $a_{n+1} = a_n + 12$ for any positive integer *n,* find a_3.

A. 30
B. 36
C. 42
D. 66

17. In the figure, the 1st pattern consists of 3 dots. For any positive integer n, the $(n + 1)$th pattern is formed by adding 4 dots to the nth pattern. Find the number of dots in the 7th pattern.



A. 23
B. 27
C. 31
D. 35

18. Solve the equation $\frac{y-4}{8} = -3$.

A. $y = -28$
B. $y = -20$
C. $y = 20$
D. $y = 28$

19. Which of the following is a linear equation in one unknown?

A. $y + 5 = 5y$
B. $p(p + 1) = -2$
C. $3m + n = -10$
D. $p^2 - 8 = 1$

20. The solution of $\frac{d}{3} + 8 = 3d$ is

A. $d = 3$.
B. $d = 1$.
C. $d = -1$.
D. $d = -3$.

21. If the sum of two consecutive integers is 21, what is the smaller number?

A. 7
B. 8
C. 9
D. 10

22. David buys a comic and a magazine for \$95. If the price of a comic is \$5 more than 2 times that of a magazine, how much is a comic?

A. \$30
B. \$35
C. \$60
D. \$65

23. The number of books owned by Emily is 5 times that owned by Pansy. If Emily gives 16 of her books to Pansy, they will have the same number of books. Find the total number of books owned by Emily and Pansy.

A. 32
B. 40
C. 48
D. 60

24. What is 200% of 70?

A. 14
B. 35
C. 84
D. 140

25. In a school, 48% of students are girls. If there are 312 boys in the school, find the total number of students.

A. 288
B. 338
C. 600
D. 650

26. John bought a book for \$144. Later, he sold the book for \$324. Find the profit percentage.

A. 20%
B. 25%
C. 80%
D. 125%

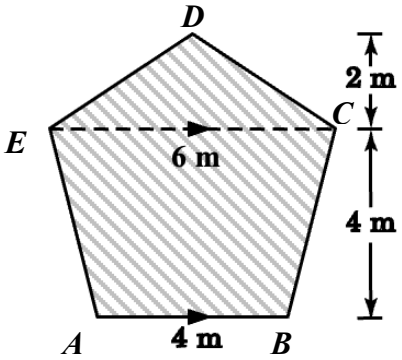
27. The weight of Andy is 20% less than that of Sandy while the weight of Tina is 20% more than that of Andy. If the weight of Tina is 72 kg, then the weight of Sandy is

A. 69 kg.
B. 75 kg.
C. 108 kg.
D. 112.5 kg.

28. Mike buys a watch at a 40% discount on the marked price. If he saves \$300, find the marked price of the watch.

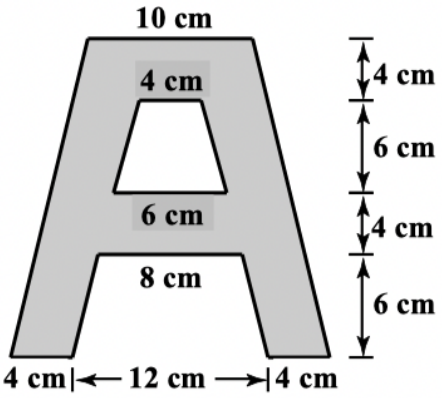
A. \$120
B. \$500
C. \$750
D. \$1 000

29. In the figure, *AB // EC*. Find the area of the polygon.



A. 15 m^2
B. 19 m^2
C. 26 m^2
D. 30 m^2

30. The figure shows a sticker in the shape of the letter 'A'. Find the area of the sticker.



A. 210 cm^2
B. 240 cm^2
C. 270 cm^2
D. 300 cm^2

Section B (40 marks)

31. Evaluate the following expressions.

(a) $(-6) \times [(+8) - (-4)]$

(b) $[(-32) - (-7)] \div (-5)$

(4 marks)

32. The general term T_n of a sequence is $4 + 2n$.

(a) Find the 6th term of the sequence.

(b) Which term of the sequence is 26?

(5 marks)

33. (a) Use index notation to express each of the following numbers as a product of prime factors.

(i) 75 (ii) 180

(b) Hence, find the H.C.F. of 75 and 180 by the method of prime factorization.

(3 marks)

34. Solve each of the following equations.

(a) $2k + 7(k+1) = 14(k-2)$

(b) $\frac{3(2x-3)}{8} - \frac{4x-1}{6} = 1$

(8 marks)

35. Simplify each of the following algebraic expressions.

(a) $5a + 9b - 8 \times a \div 2 - 2b + a^2$

(b) $(4a^3b^4)(-3ab^2)$

(6 marks)

36. Evaluate the following expressions.

(a) $(-4\frac{1}{3}) \div (+1\frac{6}{7}) - \frac{1}{3}$

(b) $(-3)^3 - (-2)^2 + (-4^2)$

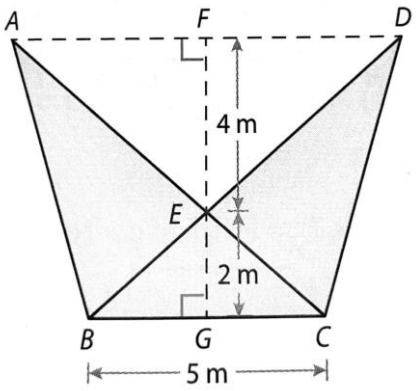
(6 marks)

37. S1A has 32 students and 75% of them pass a test.

(a) Find the number of students who pass the test.

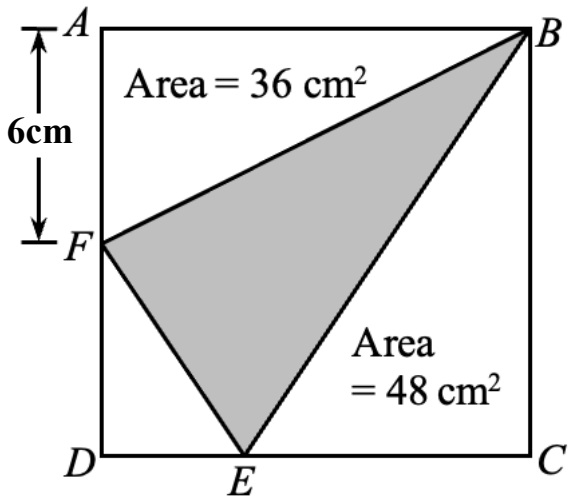
(b) It is given that three students get full marks. Among the students who pass the test, what percentage of students get full marks? (4 marks)

38. In the figure, AC cuts BD at E. Find the area of the polygon $ABCDE$. (4 marks)



Section C (30 marks)

39. In the figure, *ABCD* is a square. *F* and *E* are points on *AD* and *CD* respectively. It is given that *AF* = *FD* and the length of *AF* is 6 cm. The areas of ΔABF and ΔBCE are 36 cm^2 and 48 cm^2 respectively.



(a) Find the length of *AB*. (2 marks)

(b) Find the length of *CE*. (3 marks)

(c) Find the length of *DE* and *DF*. (2 marks)

(d) Find the area of ΔBEF. (3 marks)

40. A fast-food shop sells two kinds of cheeseburgers, single cheeseburgers and double cheeseburgers. The cost price of a double cheeseburger is 15% higher than that of a single cheeseburger. The profit percentages of selling a single cheeseburger and a double cheeseburger are 30% and 40% respectively. It is given that the profit made by selling a double cheeseburger is \$3.2 higher than that by selling a single cheeseburger.

(a) Let the cost of a single cheeseburger be \$$y$. Express the cost of a double cheeseburger in terms of y. (2 marks)

(b) Express the selling price of a single cheeseburger and a double cheeseburger in terms of y respectively. (2 marks)

(c) Find the selling prices of each single cheeseburger and double cheeseburger respectively. (4 marks)

(d) During a promotion period, the shop gives a special offer of 'buy 2 double cheeseburgers, get 1 single cheeseburger free'. If a customer buys 2 double cheeseburgers and 1 single cheeseburger, find the percentage profit or loss made by the shop. (2 marks)

41. In 2023, Mary's age was $\frac{1}{7}$ of her father's age. In 2024, Mary father's age is n and Mary's age is $\frac{1}{6}$ of her father's age.

(a) (i) Express Mary's age in 2024 in terms of n.

(ii) Find the ages of Mary and her father in 2024. (5 marks)

(b) (i) After k years, Mary's age will be $\frac{1}{4}$ of her father's age. Set up an equation (in k) of the ages of Mary and her father.

(ii) By solving the equation in (b)(i), find in which year Mary's age will be $\frac{1}{4}$ of her father's age.

(5 marks)

END OF PAPER