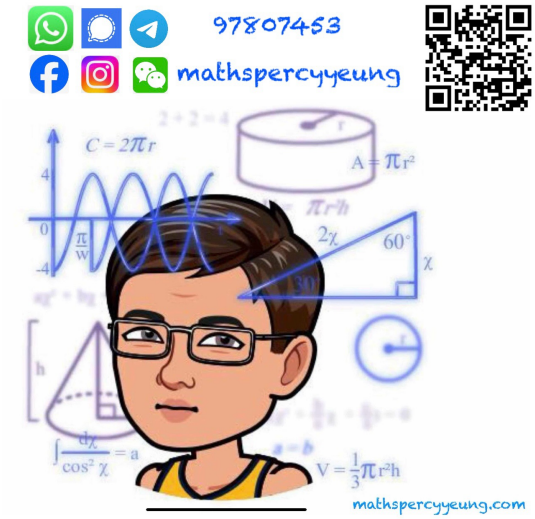
# Mid-year Examination 2023 – 2024

**Form 1**

**176 students**




**Mathematics**
**Time Allowed : 1 hour**
**Question/Answer Paper**

**Please read the following <u>instructions</u> very carefully.**

1. This paper consists of TWO sections, A and B.

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

3. This paper carries 100 marks. Attempt ALL questions in this paper. Write your answers in the spaces provided in this Question/Answer Paper.

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

| For Markers' Use Only | |
|---|---|
| **1 – 23.** | (58) |
| **24.** | (3) |
| **25.** | (3) |
| **26.** | (6) |
| **27.** | (6) |
| **28.** | (6) |
| **29.** | (6) |
| **30.** | (6) |
| **31.** | (6) |
| **TOTAL** | (100) |

**Section A (58%)**

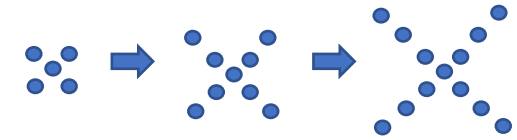
***All rough work should be done on the rough work paper provided, but will not be marked.***

| | | Answers | Marks |
|---|---|---|---|
| 1. | Find the quotient of dividing the sum of 70 and 26 by the square of –4. | 1. _____ | 2 |
| 2. | Find the H.C.F. of $2^3 \times 3 \times 5 \times 7$ and $2^2 \times 7^2 \times 11$. | 2. _____ | 2 |
| 3. | If 24▲3 is a 4-digit number which is divisible by 9, find all the possible values of ▲. | 3. ▲ = _____ | 2 |
| 4. | Arrange the following numbers in descending order.<br>$\frac{2}{3}$ , $-3$ , $-2.2$ , $2$ , $-2$ | 4. _____ | 2 |
| 5. | Evaluate the following. | 5. | |
| | (a) $\frac{7}{3} \div (-21) \times (-27)$ | (a) _____ | 2 |
| | (b) $(-45) \div \left[3 + 3 \times (-8)^2\right] \times (-7)$ | (b) _____ | 2 |
| 6. | Paul takes a lift from the 5/F in a commercial building. The lift moves up 37 floors to reach the top and then moves down 50 floors to the basement. How many floors, at least, does he have to move up to return to 5/F? | 6. _____ | 2 |
| 7. | Represent the following word phrases by algebraic expressions. | 7. | |
| | (a) Add the product of *m* and *n* to 4 and then multiply the sum by the cube of *k*. | (a) _____ | 2 |
| | (b) Subtract 8 from *x* and then divide the difference by the square of *y*. | (b) _____ | 2 |
| 8. | Simplify the following algebraic expressions. | 8. | |
| | (a) $b - 5b \times 2$ | (a) _____ | 2 |
| | (b) $(x - 3y) - 2(5y + 4x)$ | (b) _____ | 2 |
| 9. | Consider the formula $S = \frac{a}{1-r}$. Find the value of *S* if $a = \frac{1}{2}$ and $r = \frac{1}{3}$. | 9. _____ | 2 |
| | | **Subtotal:** | **/24** |

10. Consider the formula $M = \dfrac{p^2 + q^2 - r^2}{2pq}$. If $p = -3$, $q = 2$ and $r = -1$, find the value of $M$.

10. _____ 2

11. In the figure, the 1st pattern consists of 5 dots. For any positive integer $n$, the $(n + 1)^{th}$ pattern is formed by adding 4 dots to the $n$th pattern. Find the number of dots in the 8th pattern.



1st pattern 2nd pattern 3rd pattern

11. _____ 2

12. Paul is $3k$ years old now. His grandmother is $5k$ times as old as him. After 10 years, what will be the age of Paul's grandmother in terms of $k$?

12. _____ 3

13. Solve the following equations.

(a) $4(a+3) = 9 - 5(2a+5)$

(b) $\dfrac{t-19}{5} = 3t - 1$

13.

(a) $a =$ _____ 2

(b) $t =$ _____ 2

14. If $\dfrac{1}{4}$ of the sum of three consecutive even numbers is 33, find the largest number.

14. _____ 2

15. There are some \$5 coins and \$2 coins in a bag. If the total number of coins is 14 and their total value is \$55, find the number of \$2 coins in the bag.

15. _____ 2

16. Which of the following angles is the smallest?

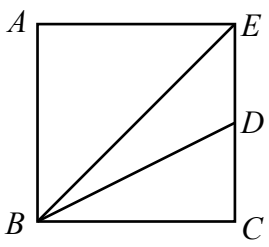
A. $\dfrac{3}{5}$ of a straight angle

B. $\dfrac{5}{4}$ of a right angle

C. $\dfrac{2}{7}$ of a round angle

16. _____ 2

17. In the figure, $ABCE$ is a square. Name a scalene triangle.




17. _____ 1

**Subtotal:** **/18**

| | | | |
|---|---|---|---|
| 18. | Find the following unknowns.<br>(a) $a$ % of 255 is 408. | 18.<br>(a) _____ | 2 |
| | (b) 45% of $b$ is 144. | (b) _____ | 2 |
| 19. | If the number of customers in a restaurant decreases by 15 from 40, find the percentage decrease in the number of customers. | 19. _____ | 2 |
| 20. | Among 120 balls in a box, 35% of them are red and there are 48 green balls. If the rest of the balls are blue, what percentage of the balls are blue? | 20. _____ | 2 |
| 21. | There are 20 girls in a choir. The number of boys in the choir is 40% less than that of the girls. Find the total number of members in the choir. | 21. _____ | 2 |
| 22. | A T-shirt is sold for \$400 at a profit of 25%. Find the profit from selling two T-shirts. | 22. _____ | 3 |
| 23. | The marked price of a TV set is 50% above the cost. If it is sold at a 40% discount, find the percentage loss. | 23. _____ | 3 |
| | | **Subtotal:** | **/16** |

**Section B (42%)**

***All working must be clearly shown in the spaces provided.***

24. Simplify $-12y \div 4 + 2 + 4 \times 7y - 5$. (3 marks)

25. The prices of a dozen of apples and a dozen of oranges are \$36 and \$48 respectively. Mary spent \$$C$ on $a$ apples and $b$ oranges.
    (a) Write down the formula for $C$. (1 mark)
    (b) If $a = 5$ and $b = 6$, how much should Mary pay? (2 marks)

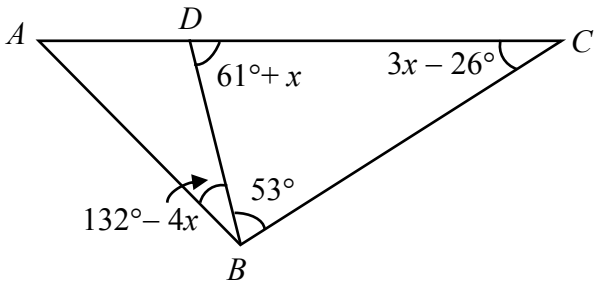
26. The general term $a_n$ of a sequence is $5n + 4$.
    (a) Find $a_2$. (1 mark)
    (b) If $a_r = 69$, find the value of $r$. (2 marks)
    (c) If $3a_{m+1} - 4a_2 = 151$, find the value of $m$. (3 marks)

27. The following table shows the age differences of three students compared with Kayla's age. It is given that '+1' represents 1 year older than Kayla.

| | Amy | Brian | Carrie |
|---|---|---|---|
| Age difference (year) | +3 | –4 | –2 |

(a) By how many years is Brian older or younger than Amy? (2 marks)
(b) By how many years is Carrie older or younger than Brian? (2 marks)
(c) Carrie is 15 years old now, find the age of Amy 8 years later. (2 marks)

28. In the figure, $ADC$ is a straight line.




(a) Find $x$. (3 marks)

(b) Is $\Delta ABC$ an obtuse-angled triangle? Explain your answer. (3 marks)

29. (a) Justin wants to sell 16 SIM cards for $33 each and make a percentage profit of 50%. Find the total profit made from selling all the cards. (3 marks)

(b) If Justin only sells half of the cards at $33 and the rest of them at a 20% discount, find the overall percentage profit or loss after selling all the cards. (3 marks)

30. On the first day of an exhibition, there were 2000 visitors. It is known that the number of visitors on the second day was 10% less than that of the first day.
    (a) Find the number of visitors on the second day. (2 marks)
    (b) If the number of visitors increased by $p$ % from the second day to the third day and it is known that the number of visitors in the third day was 1980, find
        (i) the value of $p$, (2 marks)
        (ii) the overall percentage change in the number of visitors from the first day to the third day. (2 marks)

31. Mandy, Dora and Amy are going to buy a gift for their mother and they will share the payment. Dora's share is \$81 more than 3 times that of Mandy. Amy's share is \$182 less than 5 times that of Mandy. Suppose Mandy shares \$$x$ of the payment.

(a) (i) Find Dora's share in terms of $x$. (1 mark)

(ii) Find Amy's share in terms of $x$. (1 mark)

(b) It is given that Dora's share is $\frac{3}{4}$ of Amy's share. Can they buy a mobile phone which costs \$2500 for their mother? Explain your answer. (4 marks)

**--- End of Paper ---**