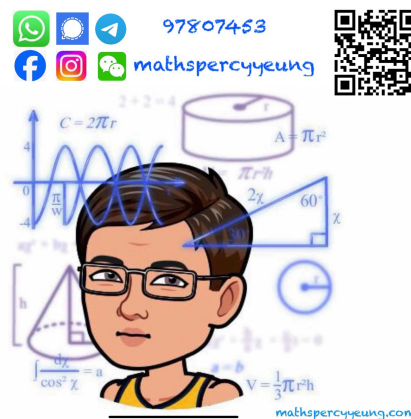**2024-2025 S3**
1ˢᵗ TERM UT 2
MATH

MC

2024 − 2025
S3 First Term Uniform Test 2

MATHEMATICS

12ᵗʰ December, 2024
Time Allowed: 30 minutes
Total Marks: 23

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should insert the information required in the spaces provided.

2. When told to open this book, you should check that all the questions are there.   Look for the words '**END OF PAPER**' after the last question.

3. All questions carry equal marks.

4. **ANSWER ALL QUESTIONS**. You should use an HB pencil to mark all your 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.

5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.

6. No marks will be deducted for wrong answers.

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

8. Calculators with 'H.K.E.A.A. Approved' can be used.

Choose the best answer for each question.

1. Jacky is 32 years old. Karen is younger than Jacky by x years. If the sum of their ages is 59, which of the following equations can be used to find the value of x?
   A. $32+(32-x)=59$
   B. $32+(32+x)=59$
   C. $32-x=59$
   D. $32+x=59$

2. The cost price of a saxophone is $2000. It is sold at a discount of 20% and the profit per cent is 30%. Find the marked price of the saxophone.
   A. $2 080
   B. $2 200
   C. $2 600
   D. $3 250

3. If a and b are constants such that $(x+4)(x-8) \equiv (x+a)^2+b$, then $b=$
   A. -48.
   B. -36.
   C. -32.
   D. -4.

4. $4a^2-4a+1-b^2=$
   A. $(2a-b-1)(2a+b+1)$.
   B. $(2a-b-1)(2a-b+1)$.
   C. $(2a+b-1)(2a-b+1)$.
   D. $(2a+b-1)(2a-b-1)$.

5. It is given that $x^2+bx+24 \equiv (x+m)(x+n)$, where m and n are integers. Which of the following cannot be the value of b?
   A. 10
   B. 11
   C. 12
   D. 14

6. $-4k^2+12k-9=$
   A. $-(2k-3)^2$.
   B. $(2k+3)^2$.
   C. $(2k-3)^2$.
   D. $-(2k+3)^2$.

7. $81a^4-16b^4=$
   A. $(9a^2+4b^2)(3a+2b)^2$.
   B. $(9a^2+4b^2)(3a+2b)(3a-2b)$.
   C. $(3a-2b)^4$.
   D. $(3a+2b)^2(3a-2b)^2$.

8. $2^9+2^{12}+6=$
   A. 100100000110_2.
   B. 100100000011_2.
   C. 1001000001100_2.
   D. 1001000000110_2.

9. $(9 \cdot 3^{n+2})^3=$
   A. 3^{3n+12} .
   B. 3^{3n+7} .
   C. 3^{2n+7} .
   D. 3^{n+7} .

10. Express $881\,621\,000 \times 10^{-5}$ in scientific notation correct to 3 significant figures.

   A. 8.81×10^3
   B. 8.816×10^3
   C. 8.82×10^4
   D. 8.82×10^3

11. $\dfrac{10x^2}{(5x^{-3})^{-2}}=$

   A. $250x^4$.
   B. $\dfrac{250}{x^4}$.
   C. $\dfrac{2x^4}{5}$.
   D. $\dfrac{2}{5x^4}$.

12. In a theatre, the price of a ticket is x. The theatre is now offering a 20% discount on the price of the ticket for each student. If the total price of the tickets for 2 adults and 5 students is at most $450, find the greatest value of x.
   A. 150
   B. 75
   C. 74
   D. 71

13. How many positive integers satisfy the inequality $3(5-2x) > \dfrac{2x-25}{3}$?
   A. 2
   B. 3
   C. 4
   D. 5

14. Solve the inequality $8(x+2)+9(x-5) < -80$.
   A. $x < -3$
   B. $x > -3$
   C. $x < 3$
   D. $x > 3$

15. Which of the following situations can be represented by the inequality $n \geq 33$?
   I. The number of students (n) in a magic club is not less than 33.
   II. The total value of n $1 coins is at most $33.
   III. n is an integer greater than 32.

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

16. If the angle of sector and the radius of a sector are increased by x% and 20% respectively so that the area of the sector is increased by 116%, then $x =$
   A. 20.
   B. 40.
   C. 50.
   D. 80.

17. A sum of $67 000 is deposited in a bank at an interest rate of 2.4% per annum for 2 years, compounded monthly. Find the interest correct to the nearest dollar.
   A. $3 255
   B. $3 274
   C. $3 291
   D. $3 765

18. The value of a computer has decreased by 12% each year. If the present value of the computer is $7 000, find the value of the computer two years ago, correct to 3 significant figures.
   A. $5 420
   B. $5 580
   C. $8 780
   D. $9 040

19. Howard's income and expenditure were $20 000 and $15 000 respectively in June. He saved the remaining. In July, his income increased by 20% and his expenditure was decreased by 20%. In July, he saves
   A. $800.
   B. $5 000.
   C. $7 000.
   D. $12 000.

20. In the figure, *ABCD* is a quadrilateral, where $\angle ABC = \angle ADC = 60°$ and $CD = CA$.
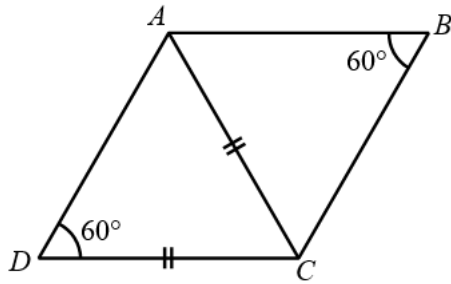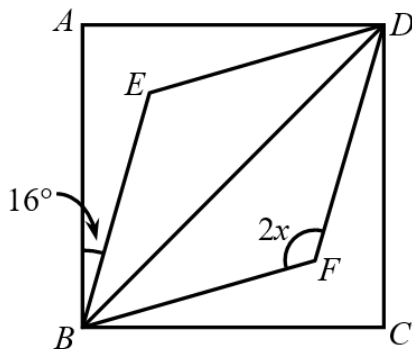

Which of the following must be true?
    I. $\triangle ADC$ is an equilateral triangle.
    II.   *ABCD* is a parallelogram.
    III. $\triangle ADC \cong \triangle CBA$
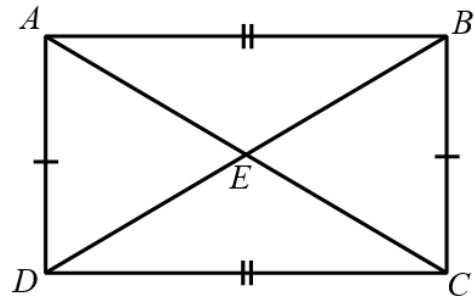
  A.   I only
  B.   III only
  C.   I and II only
  D.   II and III only

21. In the figure, *ABCD* is a square and *BFDE* is a rhombus. It is given that $\angle ABE = 16°$. Find *x*.

  A.   29°
  B.   58°
  C.   61°
  D.   122°

22. In the figure, *ABCD* is a quadrilateral, where *AB = DC* and *AD = BC*. *AC* and *BD* intersect at *E*.

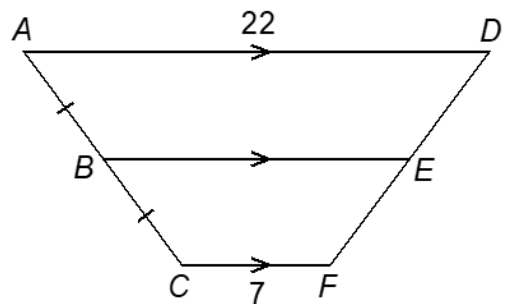

Which of the following must be true?
    I.   *ABCD* is a parallelogram.
    II. $\triangle ADC \cong \triangle CBA$
    III. *ABCD* is a rectangle.

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

23. In the figure, *ABC* and *DEF* are straight lines. It is given that $AD /\!/ BE /\!/ CF$, $AD = 22$ and $CF = 7$. Find the length of *BE*.

  A.   12
  B.   14.5
  C.   15
  D.   17

END OF PAPER