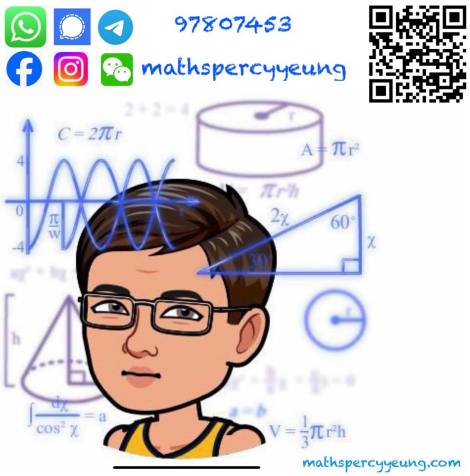
2023-2024 First/Second Term Examination (Revision)

F. 3 Mathematics

Paper 2



Time allowed : 50 minutes

Full mark : 30

This question book consists of 8 printed pages.

Instructions to candidates:

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

2. This paper consists of 30 multiple-choice questions. All questions carry equal marks.

3. Answer ALL questions. Mark your answers on the MC Answer Sheet provided with an HB pencil.

4. Choose the best answer for each question.

5. Read carefully the instructions on the MC Answer Sheet and insert the information required in the spaces provided.

6. When told to check the question paper, you should check that all the questions are there. Look for the words 'End of Paper' after the last question.

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

8. No marks will be deducted for wrong answers.

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

10. Calculator pad printed with the "HKEA Approved" / "HKEAA Approved" label is allowed. Remove the calculator cover / jacket.

2023-24 E1

1. $(x^2-6)^2-x^2=$

   A. $(x-1)(x+1)(x-6)(x+6)$.

   B. $(x-2)(x+2)(x-3)(x+3)$.

   C. $(x-1)^2(x-6)^2$.

   D. $(x-2)^2(x-3)^2$.

2. $a^2+2ab-3b^2-4a+4b=$

   A. $(a+b)(a-3b-4)$.

   B. $(a+b)(a-3b+4)$.

   C. $(a-b)(a+3b+4)$.

   D. $(a-b)(a+3b-4)$.

3. If m and n are integers and $m<0<n$, which of the following may be formed by factorizing $10x^2+mx+n$?

   A. $(x-999)(5x-999)$

   B. $(x+999)(10x-999)$

   C. $(2x-999)(5x-999)$

   D. $(2x+999)(5x+999)$

4. Which of the following expressions has/have $2x+y$ as a factor?

   I. $4x^2-y^2$

   II. $6x^2-5xy-4y^2$

   III. $6x^2+5xy-4y^2$

   A. I only

   B. III only

   C. I and II only

   D. I, II and III

5. If $8x^2+kx-2=(px-2)(qx+1)$, where p and q are positive integers, which of the following CANNOT be the value of k?

   A. -15

   B. -6

   C. 0

   D. 15

6. $\dfrac{\left(-xy^2\right)^{-3}}{xy^{-6}} =$

A. $-\dfrac{1}{x^4}$.

B. $-\dfrac{y^5}{x^4}$.

C. x^2.

D. $\dfrac{1}{x^4}$.

7. $\left(8^{2x}\right)\left(9^{3x}\right) =$

A. 5^{5x}.

B. 6^{6x}.

C. 6^{12x}.

D. 72^{5x}.

8. Which of the following is expressed in scientific notation?

A. 9.8^7

B. 98×10^7

C. 0.98×10^{-7}

D. -9.8×10^{-7}

9. $100100000101_2 =$

A. 2309_{10}.

B. 2310_{10}.

C. 4617_{10}.

D. 4618_{10}.

10. $2^{11}+2^6+12 =$

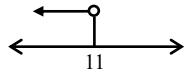
A. 1000010011_2.

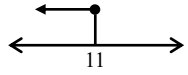
B. 1000010012_2.

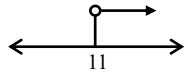
C. 100001000110_2.

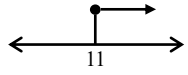
D. 100001001100_2.

11. Solve the inequality $10-2x \geq \dfrac{70-2x}{-4}$ graphically.

A. 

B. 

C. 

D. 

12. Which of the following can satisfy the inequality $7-x<10-3(x+1)$?

A. $x=2$
B. $x=1$
C. $x=0$
D. $x=-2$

13. If $0<a<b$ and $k<0$, which of the following must be true?

I. $ka<kb$
II. $a+k<b+k$
III. $ka(a+k)<kb(b+k)$

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

14. If $x<y$, which of the following must be true?

I. $x-y<0$
II. $x^2-y^2<0$
III. $(x+y)^2>0$

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

15. If the sum of three consecutive integers is more than 30, then the smallest possible value of the largest integer is

    A. 9.
    B. 10.
    C. 11.
    D. 12.

16. The value of an antique vase in 2021 was \$5 000 000. Its value increased by x% in 2022 and then decreased by x% in 2023. If its value in 2023 is \$2 500 000, what is the value of x correct to 3 significant figures?

    A. 0.293
    B. 0.707
    C. 29.3
    D. 70.7

17. The value of a car depreciates at a constant rate of 10% per year. If the depreciation in the value of the car from 2020 to 2023 is \$81300, what was the value of the car in 2020?

    A. \$90333
    B. \$271000
    C. \$300000
    D. \$813000

18. In a school, 60% of the students are girls and 40% of the students are boys. If the number of girls decreases by 20% and the number of boys remains unchanged, what is the percentage change in the total number of students?

    A. −20%
    B. −12%
    C. −8%
    D. −4.8%

19. Andy borrows \$10 000 from a bank at a simple interest rate. If he has to return a total amount of \$11800 to the bank after 4 years, what is the annual interest rate?

    A. 0.045%
    B. 0.295%
    C. 4.5%
    D. 9%

20. A sum of money was deposited in a bank at the beginning of 2021 at an interest rate of 4% p.a. compounded half-yearly. If the interest obtained after one year is \$808, what is the total interest, correct to nearest dollar, obtained at the beginning of 2023?

A. \$824
B. \$1616
C. \$1649
D. \$1681

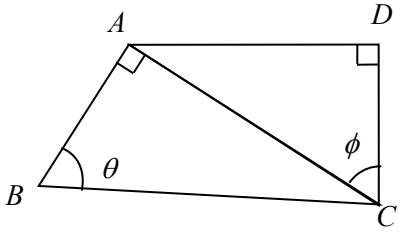
2023-24 E2

20. Let θ be an acute angle. If $\sin(90° - \theta) = \frac{49}{95}$, find the value of $\frac{\cos(90° - \theta)}{\tan(90° - \theta)} + \cos\theta$.

A. $\frac{49}{95}$
B. $\frac{98}{95}$
C. $\frac{95}{49}$
D. $\frac{475}{49}$

21. In the figure, $\frac{AD}{AB} =$

A. $\cos\phi\tan\theta$.
B. $\sin\phi\tan\theta$.
C. $\frac{1}{\cos\phi\tan\theta}$.
D. $\frac{1}{\sin\phi\tan\theta}$.

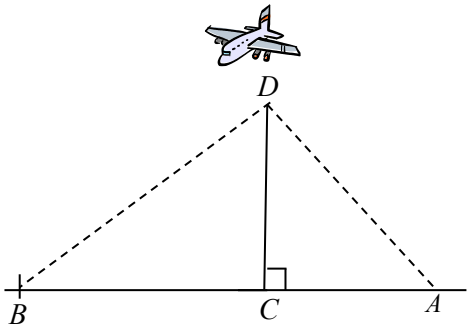


22. The bearing of B and C from A are S60°E and S30°W respectively. If B and C are 6 km and 8 km from A respectively, find the bearings of B from C correct to the nearest integer.

A. S71°W
B. N71°E
C. S67°W
D. N67°E

23. In the figure, BCA is a horizontal line. A helicopter D is 160 m vertically above point C. The angle of elevation of the helicopter from point A is 48° and the angle of depression of point B from the helicopter is 69°. Find the distance between A and B correct to 3 significant figures.

A. 205 m
B. 387 m
C. 595 m
D. 686 m



End of Paper