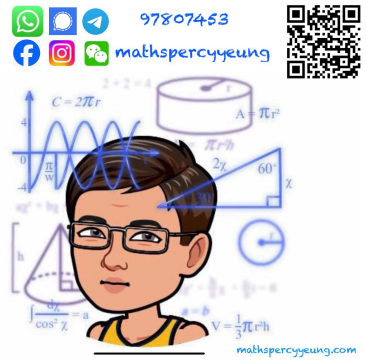
2022-2023 First/Second Term Examination (Revision)

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.

2022-23 E1

2. Factorize $a^2 + 2a - 15 + ab - 3b$.

   A. $(a-3)(a+5+b)$

   B. $(a-3)(a-5+b)$

   C. $(a+3)(a+5+b)$

   D. $(a+3)(a-5+b)$

3. Which of the following expressions has/have $2x-3$ as a factor?

   I. $-4x^2 + 6x$

   II. $2x^2 + 5x - 12$

   III. $6x^2 + 7x - 3$

   A. I only

   B. II only

   C. I and II only

   D. II and III only

4. Factorize $2(x-1)^2 + 7(x-1) + 6$.

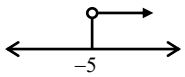
   A. $(2x+1)(x+3)$

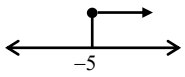
   B. $(2x+3)(x+1)$

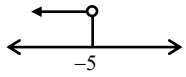
   C. $(x+2)(2x+3)$

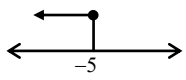
   D. $(x+1)(2x+1)$

5. Solve the inequality $(x+2)(x-3) \le (x+1)(x-1)$ graphically.

   A. 

   B. 

   C. 

   D. 

6. Solve the inequality $\frac{x-1}{3} \leq 5-x$.

A. $x \leq 3$

B. $x \leq 4$

C. $x \geq 3$

D. $x \geq 4$

7. If the sum of two consecutive even numbers is not greater than 58, then the greatest possible value of the larger number is

A. 27.

B. 28.

C. 29.

D. 30.

8. If $m \geq n$, which of the following must be true?

I. $m-5 \geq n-5$

II. $-\frac{3m}{2} \leq -\frac{3n}{2}$

III. $m^2 \geq n^2$

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

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

I. $a>b$

II. $\frac{1}{a}>\frac{1}{b}$

III. $a+b<0$

A. I and II only

B. II and III only

C. I and III only

D. I, II and III

10. The height of a trapezium is 6 cm. The upper base of the trapezium is shorter than its lower base by 3 cm. If the area of the trapezium is at least 45 cm^2, the minimum possible length of the upper base of the trapezium is

    A. 5 cm.
    B. 6 cm.
    C. 7 cm.
    D. 8 cm.

11. If a number is first increased by 50% and then increased by r %, it would be twice of its original value. The value of r is

    A. 20.
    B. 25.
    C. $33\frac{1}{3}$.
    D. 50.

12. A sum of money is deposited in a bank at an interest rate of 3.5% p.a.. If the simple interest obtained 5 years later is \$8750, find the principal.

    A. \$40 000
    B. \$45 000
    C. \$50 000
    D. \$55 000

13. The price of a smartphone dropped from \$9800 last year to \$8330 this year. Find the decay factor.

    A. $1+15\%$
    B. $1-15\%$
    C. 15%
    D. -15%

14. \$$P$ is invested at r% p.a. compounded quarterly for n years. The total amount received is

    A. $\$P(1+r\%)^n$.
    B. $\$P(1+r\%)^{4n}$.
    C. $\$P\left(1+\frac{r\%}{4}\right)^n$.
    D. $\$P\left(1+\frac{r\%}{4}\right)^{4n}$.

15. The table below shows the salaries tax rate:

Net chargeable income	Tax rate
On the first \$40 000	2%
On the next \$40 000	7%
On the next \$40 000	12%
Remainder	17%

If Mr Wong paid \$9250 as salaries tax, find his net chargeable income.

A. \$70 000

B. \$85 000

C. \$110 000

D. \$125 000

2022-23 E2

15. If x and y are acute angles such that $x + y = 90°$, which of the following must be true?

I. $\sin x = \cos y$

II. $\tan x \tan y = 1$

III. $\sin^2(90° - x) = 1 - \cos^2 y \tan^2 y$

A. I only

B. I and II only

C. II and III only

D. I, II and III only

16. If $\tan\theta = \frac{x}{y}$ and $0° < \theta < 90°$, then $(\sin\theta - \cos\theta)^2$ =

A. $\frac{x-y}{x+y}$.

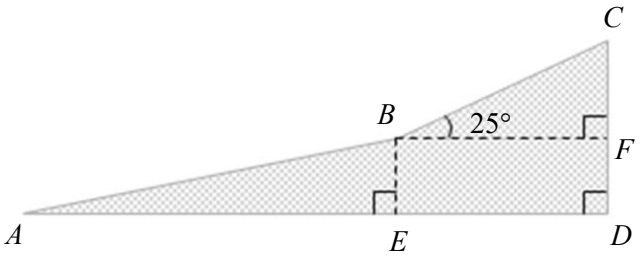
B. $\frac{1-2xy}{x^2+y^2}$.

C. $\frac{(x-y)^2}{x^2+y^2}$.

D. $\frac{x^2-y^2}{x^2+y^2}$.

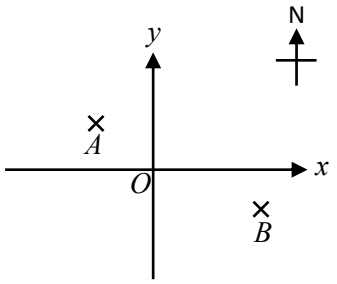
18. The figure shows a hillside. If the gradient of AB is 1 : 5, AB = 255 m, BC = 155 m, $\angle CBF = 25°$, find the vertical distance between A and C correct to 3 significant figures.

A. 116 m
B. 123 m
C. 316 m
D. 391 m



19. In the figure, $A(-200, 150)$ and $B(400, -120)$ are two points on a map with rectangular coordinate plane, where O is the origin, introduced. Find the true bearing of B from A correct to the nearest degree.

A. 099°
B. 114°
C. 171°
D. 294°



20. The angle of elevation of M from N is 76°. If M is located at a level of 20 cm above N, the distance between M and N is

A. $20\sin 76°$ cm.

B. $\dfrac{20}{\tan 14°}$ cm.

C. $\dfrac{20}{\sin 14°}$ cm.

D. $\dfrac{20}{\cos 14°}$ cm.

End of Paper