



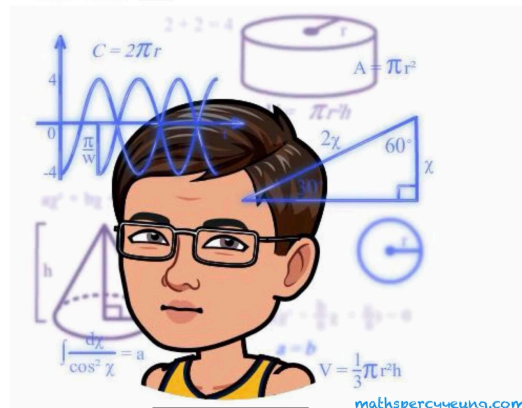
Class : _____ Name : _____

Time allowed : 50 minutes

Full mark : 30

This question book consists of 8 printed pages.

Instructions to candidates:



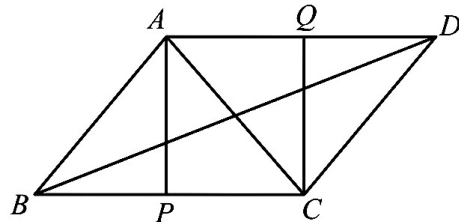
1. Write your name, class and class number in the space provided on this cover.
2. This paper consists of 30 multiple-choice questions. All questions carry equal marks.
3. Answer ALL questions. Mark your answers on the MC Answer Sheet provided with an HB pencil.
4. Choose the best answer for each question.
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.

1. If $bx^2 + 3x - 3b = (2x - 3)(ax + b)$, where a and b are constants, then $b =$
- A. -2 .
 - B. 2 .
 - C. 3 .
 - D. 6 .
2. $\left(\frac{2^{3+n}}{4^n}\right)(8^{n-1}) =$
- A. 2^{2n-6} .
 - B. 2^n .
 - C. 4^{n-1} .
 - D. 4^n .
3. $2^{12} + 2^9 + 2^5 + 9 =$
- A. 100100010101_2 .
 - B. 100100010110_2 .
 - C. 1001000101001_2 .
 - D. 1001000101010_2 .
4. Find the greatest integer satisfying the inequality $\frac{3x-1}{2} \geq 4(x-2)$.
- A. 2
 - B. 3
 - C. 6
 - D. 7
5. If $a < b$ and $k < 0$, which of the following must be true?
- A. $ka < kb$
 - B. $k - a > k - b$
 - C. $ab > k$
 - D. $\frac{k}{a} > \frac{k}{b}$

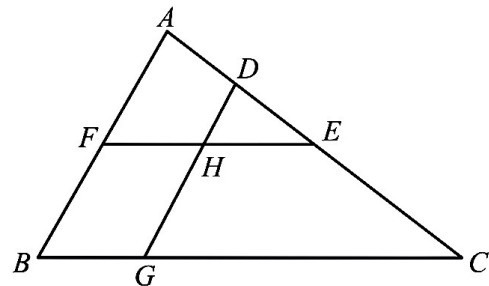
6. If the percentage change in the perimeter of a rectangle is +10%, which of the following is/are possible?
- The area of the rectangle is increased by 21%.
 - The width of the rectangle remains unchanged.
 - The percentage change in the area of the rectangle is negative.
- I only
 - I and II only
 - II and III only
 - I, II and III

7. A sum of \$ P is deposited in a bank at an interest rate of 3% p.a. for 2 years, compounded monthly. What is the least integral value of P if the interest to be obtained is not less than \$1000?
- 16192
 - 16193
 - 33333
 - 33334

8. In the figure, $ABCD$ is a parallelogram. P and Q are points on BC and AD respectively such that $APCQ$ is a square. It is given that $\angle ABC = \angle CAD$. Which of the following are true?
- $\triangle ABP \cong \triangle CDQ$
 - $\triangle APC \sim \triangle ACD$
 - BD is the angle bisector of $\angle ADC$.
- I and II only
 - I and III only
 - II and III only
 - I, II and III



9. In the figure, D, E, F and G are points on $\triangle ABC$ such that $AD:DE:EC = 1:1:2$ and DG cuts FE at H . It is given that $BGHF$ is a parallelogram. If $FE = 10$ cm, then $GC =$
- 10 cm.
 - 12 cm.
 - 15 cm.
 - 20 cm.

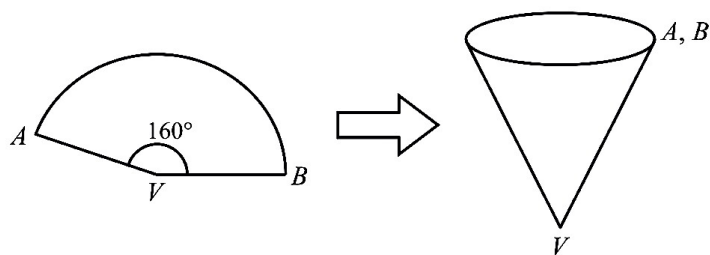


10. Suppose $\triangle ABC$ is a right-angled triangle such that $\angle ABC = 90^\circ$. Which of the following must be true?
- If O is the circumcentre of $\triangle ABC$, then $OB \perp AC$.
 - If I is the incentre of $\triangle ABC$, then $\angle IAB = \angle IAC$.
 - If G is the centroid of $\triangle ABC$, then $GA = GB = GC$.
 - If H is the orthocentre of $\triangle ABC$, then H lies on AC .

11. If the base area and the volume of a right pyramid with a square base is 100 cm^2 and 400 cm^3 respectively, then the total surface area of the pyramid is
- 180 cm^2 .
 - 260 cm^2 .
 - 340 cm^2 .
 - 360 cm^2 .

12. In the figure, sector VAB is folded to form a right circular cone with base area $64\pi \text{ cm}^2$ by joining VA and VB . If $\angle AVB = 160^\circ$, find the volume of the cone correct to 3 significant figures.

- 1080 cm^3
- 1210 cm^3
- 2160 cm^3
- 3240 cm^3

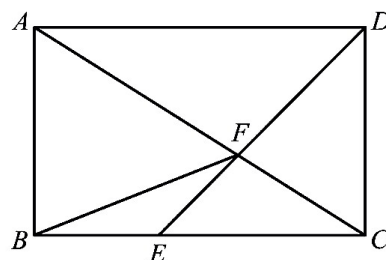


13. A metal solid sphere of radius $r \text{ cm}$ is melted and recast into a right circular cone of base radius $r \text{ cm}$. Find the percentage change in the total surface area correct to 3 significant figures.

- -49.2%
- $+3.08\%$
- $+21.9\%$
- $+28.1\%$

14. In the figure, $ABCD$ is a rectangle. E is a point on BC such that $BE : EC = 1 : 2$. AC cuts DE at F . If the area of $\triangle ADF$ is 18 cm^2 , then the area of $\triangle BEF$ is

- 4 cm^2 .
- 4.5 cm^2 .
- 6 cm^2 .
- 9 cm^2 .



15. By cutting the top part of a pyramid (P) along a plane which is parallel to the base of the pyramid, a smaller pyramid (S) and a frustum (F) are formed. It is given that the ratio of the height of S to the height of F is $3:2$. If the volume of F is 196 cm^3 , find the volume of P .
- 250 cm^3
 - 294 cm^3
 - 490 cm^3
 - 661.5 cm^3
16. If $A(-3, 5)$, $B(-3, 0)$, $C(2, 2)$ and D are the vertices of a parallelogram, then the coordinates of D can be
- $(2, -3)$.
 - $(2, 5)$.
 - $(-8, 2)$.
 - $(-8, 7)$.
17. The straight lines L_1 and L_2 cuts the x -axis at $A(-4, 0)$ and B respectively. L_1 and L_2 intersect at $(8, 6)$. If $L_1 \perp L_2$, then the coordinates of B are
- $(4, 0)$.
 - $(5, 0)$.
 - $(11, 0)$.
 - $(20, 0)$.
18. The coordinates of A , B and C are $(-2, 1)$, $(14, 9)$ and $(6, 15)$ respectively. P is a point on AB such that $AP:PB = 3:5$. Q is the mid-point of BC . Which of the following is/are true?
- $PQ = 10$
 - $PQ \perp BC$
 - $PQ \parallel AC$
- I only
 - I and II only
 - II and III only
 - I, II and III
19. The x -coordinate of the circumcentre of $\triangle ABC$ is 1. If the coordinates of A and B are $(6, 2)$ and $(1, 7)$ respectively, then the y -coordinate of the circumcentre of $\triangle ABC$ is
- -1 .
 - 0 .
 - 1 .
 - 2 .

20. If $\sin \theta = \sqrt{k}$, where $0^\circ < \theta < 90^\circ$ and k is a positive constant, then $\tan(90^\circ - \theta) =$

A. $\sqrt{\frac{1-k}{k}}$.

B. $\sqrt{\frac{1+k}{k}}$.

C. $\sqrt{\frac{k}{1-k}}$.

D. $\sqrt{\frac{k}{1+k}}$.

21. $ABCD$ is a rhombus where $\angle ABC = 60^\circ$. If the perimeter of the rhombus is 32 cm, find the length of the longer diagonal of the rhombus.

A. 4 cm

B. $4\sqrt{3}$ cm

C. 8 cm

D. $8\sqrt{3}$ cm

22. It is given that $A + B = 90^\circ$, where A and B are acute angles. Which of the following must be true?

I. $\sin^2 A + \cos^2 B = 1$

II. $\tan A = \frac{\sin A}{\sin B}$

III. $\tan A + \tan B = \frac{1}{\cos A \cos B}$

A. I only

B. I and II only

C. II and III only

D. I, II and III

23. The true bearing of B and C from A are 070° and 160° respectively. The distance between A and B is 39 km while the distance between B and C is 65 km. If P is the mid-point of AC , find the compass bearing of B from P correct to the nearest degree.

A. N 36° E

B. N 56° E

C. S 36° W

D. S 56° W

24. The following table shows the numbers of calculators owned by 30 students, where x and y are positive integers.

Number of calculators owned by a student	1	2	3	4	5
Number of students	x	8	3	2	y

If the median of the number of calculators owned by the students is 1, find the mean number of calculators owned by the students.

- A. 1.5
 B. 1.67
 C. 1.8
 D. 1.93
25. Find the median of the following data presented by a stem-and-leaf diagram.

<u>Stem (10)</u>	<u>Leaf (1)</u>
1	1 3 4
2	0 1 2 5 6 8 8
3	3 3 3 3 7 9

- A. 7
 B. 26
 C. 27
 D. 34
26. Suppose the mean price of 5 different models of smartphone is $\$k$. The price of each model of smartphone depreciated at a constant rate of 20% per year. Find the mean price of the 5 different models of smartphone after 3 years.
- A. $\$0.48k$
 B. $\$0.512k$
 C. $\$0.8k$
 D. $\$1.728k$
27. The following table shows the results of Andy in three tests.

	Test 1	Test 2	Test 3
Marks	72	76	x
Weight	25	15	30

It is given that x is an integer. If the weighted mean mark of Andy in the three tests is higher than the mean mark of him in the three tests, find the least possible value of x .

- A. 76
 B. 77
 C. 78
 D. 79

28. A bag contains five cards marked with the numbers 2, 2, 3, 6 and 9 respectively. If two cards are drawn at random from the bag at the same time, find the probability that the sum of the numbers on the cards drawn is an even number.
- A. $\frac{1}{3}$
 - B. $\frac{2}{5}$
 - C. $\frac{4}{5}$
 - D. $\frac{13}{25}$
29. There are two black balls and one white ball in a box. Three balls are drawn one by one at random from the box with replacement. Find the probability that the colour of the first ball drawn and the colour of the third ball drawn are the same.
- A. $\frac{1}{3}$
 - B. $\frac{3}{8}$
 - C. $\frac{5}{9}$
 - D. $\frac{2}{3}$
30. There are three \$20 notes and two \$50 notes in a bag. In a game, two notes are drawn at random from the bag at the same time. If the values of the two notes drawn are the same, a prize equal to the total amount of the two notes will be awarded; otherwise, no prize will be awarded. Find the expected value of the prize awarded in a game.
- A. \$17.6
 - B. \$22
 - C. \$30.4
 - D. \$32

End of Paper