



INSTRUCTIONS

- 1. There are 47 questions in this paper.
- 2. Time allowed is 65 minutes.
- 3. Answer ALL questions in the separate ANSWER BOOKLET.
- 4. The use of HKEAA approved calculators is permitted.
- 5. Unless otherwise specified, numerical answers should be either exact or correct to 3 significant figures.
- 6. Rough work should be done on the rough work sheet provided.
- 7. The diagrams in this paper are not necessarily drawn to scale.

FORMULAS FOR REFERENCE

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Sector	Arc length	=	$2\pi r \times \frac{\theta}{360^{\circ}}$
	Area	=	$\pi r^2 \times \frac{\theta}{360^{\circ}}$
Sphere	Surface area	=	$4\pi r^2$
	Volume	=	$\frac{4}{3}\pi r^3$
Cylinder	Curved surface area	=	$2\pi rh$
	Volume	=	$\pi r^2 h$
Cone	Curved surface area	=	πrl
	Volume	=	$\frac{1}{3}\pi r^2h$
Prism	Volume	=	base area × height
Pyramid	Volume	=	$\frac{1}{3}$ × base area × height

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- SECTION A: Choose the best answer for each question. You should mark all your answers in the ANSWER BOOKLET.
- 1. A mathematics problem on division is $8 \div N$, where N is a 2-digit number. Which of the following **CAN** be the result?
 - A. 0.01
 - B. 0.1
 - C. 1
 - D. 10
- 2. $(x+x)^2 =$
 - A. 2(2*x*).
 - B. $2(x^2)$.
 - C. $(2x)^2$.
 - D. $(x^2)^2$.
- 3. The number of terms of the polynomial $6y^7 y^2 y + 5$ is
 - A. 4.
 - B. 5.
 - C. 6.
 - D. 7.

4.
$$2^{-6} =$$

- A. -64. B. -12. C. $\frac{1}{12}$. D. $\frac{1}{64}$.
- 5. Determine whether each of the following is factorization or expansion.

(i)	(x+1)(x+2)(x+5)	(ii)	$x^3 + 8x^2 + 17x + 10$
	$= x^3 + 8x^2 + 17x + 10$		=(x+1)(x+2)(x+5)

- A. (i) Factorization (ii) Factorization
- B. (i) Expansion (ii) Expansion
- C. (i) Expansion (ii) Factorization
- D. (i) Factorization (ii) Expansion
- 6. Which of the following statements is correct?

A.
$$\frac{1}{10}$$
 is the root of the equation $x + 10 = 0$.

- B. $-\frac{1}{20}$ is the root of the equation x + 20 = 0.
- C. 30 is the root of the equation x + 30 = 0.
- D. -40 is the root of the equation x + 40 = 0.



The above figure shows the graphs of 15x + y - 5 = 0 and 10x + 3y + 20 = 0.

According to the given graphs, solve the simultaneous equations $\begin{cases} 15x + y - 5 = 0\\ 10x + 3y + 20 = 0 \end{cases}$ graphically.

A. (1, -10)

7.

- B. (-10, 1)
- C. (-2, 0)
- D. (0, 5)
- 8. The monthly salary of Alice is x. The monthly salary of Fanny is 2 times that of Alice. If the total amount of their annual salary is **more than** \$400 000, which of the following inequalities can be used to find the range of values of x?
 - A. $12(x+2x) \ge 400\ 000$
 - B. $12(x+2x) > 400\ 000$
 - C. $12\left(x + \frac{x}{2}\right) \ge 400\ 000$ D. $12\left(x + \frac{x}{2}\right) > 400\ 000$

- 9. The temperature of a cup of tea is 63°C (correct to the nearest °C). Which of the following could be its actual temperature?
 - A. 63.6°C
 - B. 63.5°C
 - C. 62.5°C
 - D. 62.4°C

10.



The solid in the figure is a rhombicuboctahedron. Its surfaces consist of 18 squares and 8 equilateral triangles. Each of its side lengths is *a*. By considering the **dimensions**, which of the following could be expressed by $\frac{2}{3}(6+5\sqrt{2})a^3$?

- A. Total sum of the lengths of the solid
- B. Height of the solid
- C. Total surface area of the solid
- D. Volume of the solid

11. Which of the following figures CANNOT represent a polygon?



12. A cuboid is placed horizontally as shown. It is cut vertically along the line PQ.



B.

D.

Which of the following could express the plane diagram of the cross-section?

A.





C.





13. Figure X is changed to Figure Y after a single transformation. What is the corresponding transformation?





- A. Translation
- B. Rotation
- C. Reflection
- D. Enlargement





В.

D.

Which of the following triangles is congruent to $\triangle ABC$ as shown in the above figure?











C.



Which of the following nets CANNOT be folded into the cube above?



- 16. In $\triangle ABD$, *BCD* and *AED* are straight lines. $EC \perp BD$, BC = 16 cm and BD = 32 cm. *EC* **MUST** be
 - A. a perpendicular bisector of $\triangle ABD$.
 - B. an angle bisector of $\triangle ABD$.
 - C. a median of $\triangle ABD$.
 - D. an altitude of $\triangle ABD$.



15.

17. In the figure, which point can be represented by (-3, -4)?

Р

Q

R

S

A.

B.

C.

D.





18. In the figure, the line L_1 is perpendicular to a pair of parallel lines L_2 and L_3 .



The slope of L_3 is $\frac{2}{5}$. Find the slopes of L_1 and L_2 .

_	slope of L_1	slope of L_2
A.	$-\frac{5}{2}$	$\frac{2}{5}$
B.	$\frac{5}{2}$	$\frac{2}{5}$
C.	$-\frac{5}{2}$	$-\frac{2}{5}$
D.	$\frac{2}{5}$	$-\frac{5}{2}$

19. The following table shows the number of books read by Sarah last week.

Day of the Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Frequency	1	5	3	2	4	8	9

Which of the following is the most suitable for presenting the data above?

- A. Stem-and-leaf diagram
- B. Bar chart
- C. Cumulative frequency curve
- D. Scatter diagram
- 20. The diagram below shows the queuing times of customers at Great Hotpot Restaurant and Nice Hotpot Restaurant yesterday.



Based on the diagram above, Mr Chan believes that the average queuing times at the two hotpot restaurants yesterday are the same.

Which of the following statements is the best reason that Mr Chan is **misled** by the above diagrams?

- A. The total numbers of customers at the two hotpot restaurants are not shown.
- B. The numbers of seats at the two hotpot restaurants are not shown.
- C. The scales of the two vertical axes are not the same.
- D. The scales of the two horizontal axes are not the same.

SECTION B: Write ALL the answers in the ANSWER BOOKLET. Working need not be shown.

21. A city used directed numbers to represent the average temperature each month. For example,

-5 °C represents 5 degrees Celsius below zero.

Use a directed number to represent each of the following situations:

- (i) The average temperature in June was 13 degrees Celsius.
- (ii) The average temperature in January was 2 degrees Celsius below zero.
- 22. Round off 1.027 3 to 2 decimal places.
- 23. Use the symbol '×' to mark the number $\frac{3}{8}$ on the number line given in the ANSWER BOOKLET.

Example: $\frac{11}{8}$ is marked on the number line below.



- 24. The n^{th} term of a sequence is 1-3n. Find the value of the 4th term of the sequence.
- 25. Simplify 8x + 6y 5y + x.
- 26. Factorize $16 x^2$.
- 27. Solve the equation $3 = \frac{x 12}{x}$.

- 28. Expand (1-2x)(1+2x).
- 29. Make x the subject of the formula $y = \frac{x}{6} + 1$.
- 30. According to the diagram, write down an inequality in x.



- 31. The radius of a circle is 29 cm. Find its circumference. Express the answer in terms of π .
- 32. The figure below has reflectional symmetry. Find the number of axes of symmetry.



33. In the figure, ABC is a straight line. AB = AD = BD and $\angle BDC = 20^{\circ}$, find x.



34. In the figure, *ABCDEFGH* is a cuboid. Name the angle between the vertical plane *ABGF* and the horizontal plane *FGHE*.



35. In the figure, AC is the diagonal of square ABCD. Find the value of x.



36. Referring to the figure, find the true bearing of Q from P.



- 37. Determine whether each of the following data is discrete or continuous.
 - (i) The number of light bulbs produced by a factory daily
 - (ii) The weight of each light bulb produced by a factory

38. The stem-and-leaf diagram below shows the number of pages of each book in Emily's home.

Stem (10 pages)	Leaf (1 page)						
13	0	5	7				
14	0	0	4	8	9		
15	0	3	3	6	6	8	
16	1	3	7	9			
17	5	8					

Number of pages of each book in Emily's home

According to the above stem-and-leaf diagram, answer the following questions.

- (a) How many books are there in Emily's home?
- (b) How many pages are there in the book with the most pages in Emily's home?
- (c) Find the median of the number of pages of Emily's books at home.
- 39. The following data show the scores of 7 athletes in a gymnastics competition.

7.6, 6.8, 6.9, 7.5, 7.3, 7.3, 6.3

Find the mean and the median of the above data.

SECTION C: All working must be clearly shown. Write the mathematical expressions, answers and statements/conclusions in the spaces provided in the ANSWER BOOKLET.

40. Candy deposits \$40 000 in a bank. The interest rate is 5% p.a. **compounded** yearly. Find the amount she will receive after 2 years.



The figure shows a map of scale $1:10\ 000$. On the map, the distance between spot A and spot B is 4.5 cm. Find the actual distance between spot A and spot B. Give the answer in m.

42. Complete the table for the equation y = -x + 1 in the **ANSWER BOOKLET**.

X	- 3	0	3
У		1	

According to the table, draw the graph of this equation on the rectangular coordinate plane given in the **ANSWER BOOKLET**.

41.

43. In the figure, Box A and Box B are similar solids. Their heights are 5 cm and 10 cm respectively. The volume of Box B is 3 600 cm³. Find the volume of Box A.



44. In the figure, *ABC* is a straight line. $\angle ABE = 115^{\circ}$ and reflex $\angle BED = 295^{\circ}$. Prove that *AC* // *DE*.



45. The screen of a smartphone is a rectangle. Its length and diagonal are 10 cm and 12.5 cm respectively. Find the width of the screen.



46. In the figure, a thermometer AB is hanging on the wall of a laboratory vertically and its length is 0.45 m. The horizontal distance *BC* between Joe's eyes and the bottom of the thermometer is 2.19 m.

Find the angle of elevation θ of the top of the thermometer point A that Joe is looking at. (Correct to 3 significant figures)



47. The following shows the monthly stationery expenditure (\$) of Happy Company last year.

410, 500, 550, 600, 630, 700, 710, 720, 890, 940, 1260, 1450

It is given that the mean monthly stationery expenditure was \$780 last year. Hence the manager claimed, 'Last year, more than half of the months with stationery expenditure had over \$780.' Do you agree with the manager's claim? Explain your answer.

END OF PAPER

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