9	M	E	4	(	Q	)

Education Bureau

Territory-wide System Assessment 2025

Secondary 3 Mathematics

QUESTION BOOKLET

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.

SECTION A: Choose the best answer for each question.
You should mark all your answers in the ANSWER BOOKLET.

1. $3^4 =$

A. 34 .

B. 3×4 .

C. $4 \times 4 \times 4$.

D. $3 \times 3 \times 3 \times 3$.

2. Round off 2.035 74 to 2 decimal places.

A. 2.0

B. 2.03

C. 2.04

D. 2.036

3. $a + a - a \times b =$

A. a .

B. ab .

C. $a + b$.

D. $2a - ab$.

4. Which of the following is the solution of $6x - 5 = 0$?

A. $x = \frac{5}{6}$

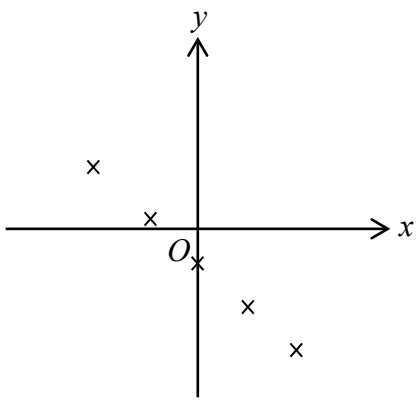
B. $x = \frac{6}{5}$

C. $x = -\frac{5}{6}$

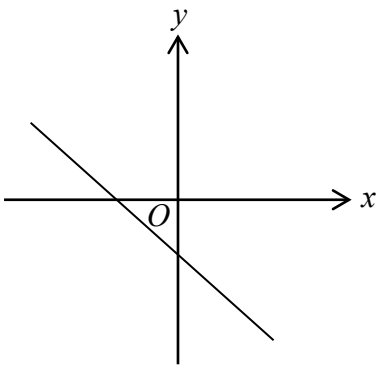
D. $x = -\frac{6}{5}$

5. Which of the following may represent the graph of the equation $2x + 3y + 8 = 0$?

A.



B.



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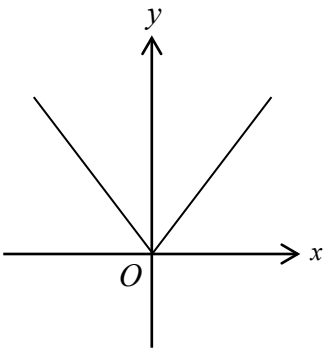

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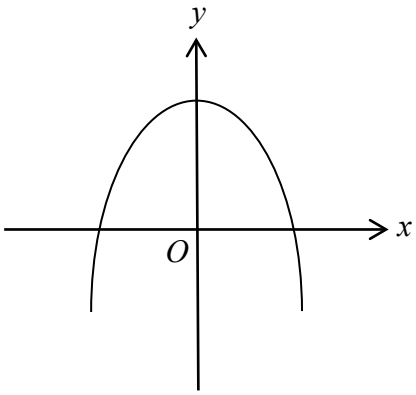


6. Tony buys 1 smartphone and 2 smartwatches for \$15 000 . The price of a smartphone is 3 times the price of a smartwatch. It is given that the prices of a smartphone and a smartwatch are $\$x$ and $\$y$ respectively. Which of the following pairs of simultaneous equations shows the relations between x and y ?

A. $\begin{cases} 2x+y=15\,000 \\ 3x=y \end{cases}$

B. $\begin{cases} 2x+y=15\,000 \\ x=3y \end{cases}$

C. $\begin{cases} x+2y=15\,000 \\ 3x=y \end{cases}$

D. $\begin{cases} x+2y=15\,000 \\ x=3y \end{cases}$

7. $1.35 \times 10^5 =$

A. 135 000 .

B. 13 500 000 .

C. 0.000 135 .

D. 0.000 013 5 .

8. Determine whether each of the following is an expression of expansion or factorisation.

(i)	$2x^3 - 5x^2 - x + 6$ $= (2x - 3)(x + 1)(x - 2)$	(ii)	$(2x - 3)(x + 1)(x - 2)$ $= 2x^3 - 5x^2 - x + 6$

A. (i) Expansion (ii) Expansion

B. (i) Factorisation (ii) Expansion

C. (i) Expansion (ii) Factorisation

D. (i) Factorisation (ii) Factorisation

9. $\frac{2y}{x}+\frac{1}{4x}=$

A. $\frac{9y}{4x}$.

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

C. $\frac{2y+1}{5x}$.

D. $\frac{8y+1}{4x}$.

10. If $x>-7$, which of the following **CANNOT** be the value of x ?

A. -8

B. -5

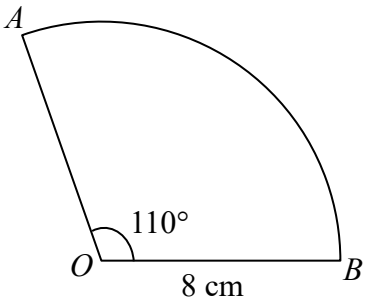
C. 0

D. 6

11. The length of a student card is measured as 9 cm (correct to the nearest cm). Which of the following are the lower limit and upper limit of the actual length of the student card ?

	Lower limit	Upper limit
A.	8 cm	10 cm
B.	8.5 cm	9.5 cm
C.	8.9 cm	9.1 cm
D.	8.95 cm	9.05 cm

12. In the figure, the radius of sector OAB is 8 cm and $\angle AOB = 110°$. Find the area of the sector.



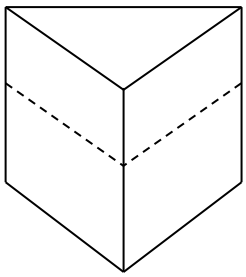
A. $\pi(8) \times \frac{110°}{360°}$ cm^2

B. $\pi(8)^2 \times \frac{110°}{360°}$ cm^2

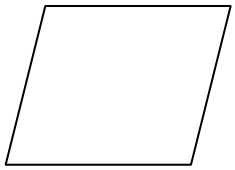
C. $2\pi(8) \times \frac{110°}{360°}$ cm^2

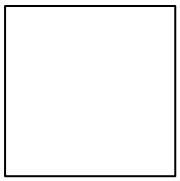
D. $2\pi(8)^2 \times \frac{110°}{360°}$ cm^2

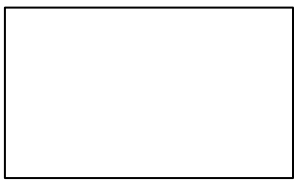
13. A right prism is placed horizontally as shown. Isabella cuts along the dotted line to obtain a section parallel to the base.

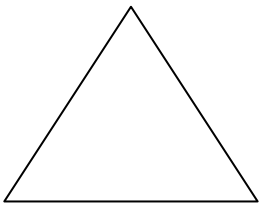


Which of the following diagrams can be the section ?

A. 

B. 

C. 

D. 

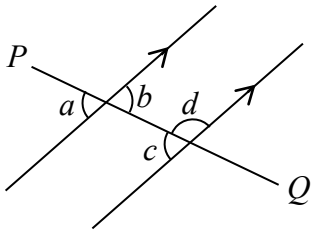
14. In the figure, PQ is a straight line. Which of the following is a pair of alternate interior angles?

A. a and c

B. a and d

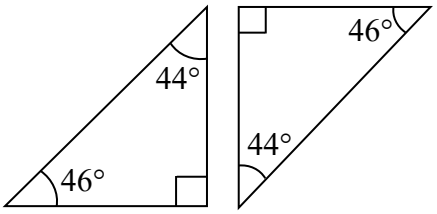
C. b and c

D. b and d

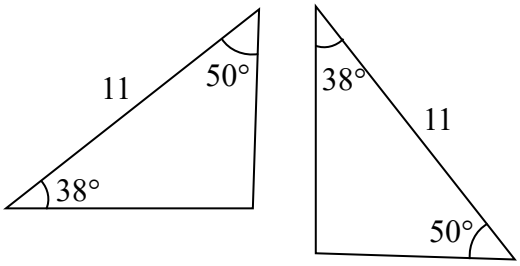


15. Which of the following pairs of triangles **MUST** be congruent?

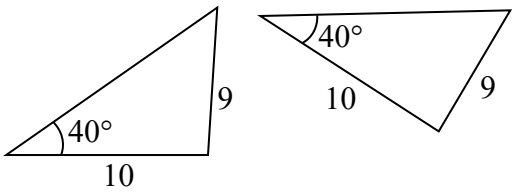
A.



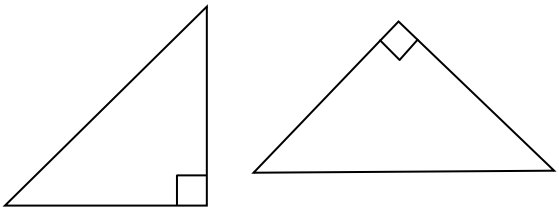
B.



C.

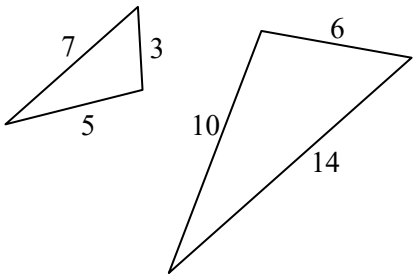


D.

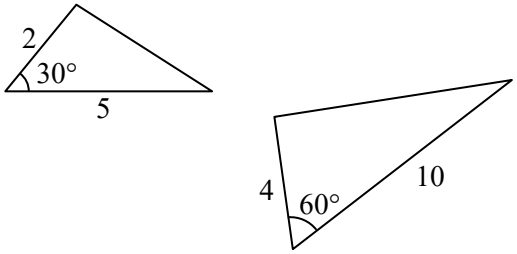


16. Which of the following pairs of triangles **MUST** be similar?

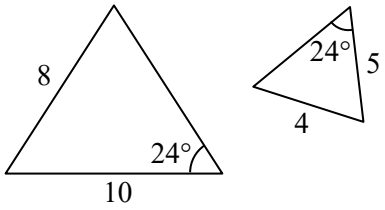
A.



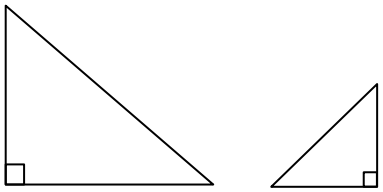
B.



C.



D.



17. In the rectangular coordinate plane, $H(3, 2)$ and $K(8, -5)$ are two points on a straight line L. The slope of L =

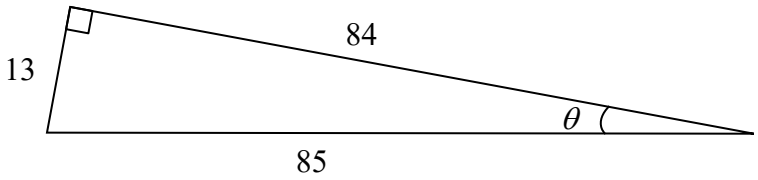
A. $\dfrac{-5-2}{8-3}$.

B. $\dfrac{2-(-5)}{8-3}$.

C. $\dfrac{8-3}{2-(-5)}$.

D. $\dfrac{8-3}{-5-2}$.

18. Find the value of $\tan\theta$ in the figure.



A. $\frac{13}{84}$

B. $\frac{13}{85}$

C. $\frac{84}{13}$

D. $\frac{84}{85}$

19. The table below shows the monthly average temperatures recorded in Hong Kong during the first half of 2024 .

Month	January	February	March	April	May	June
Temperature (°C)	17.9	19.4	21.1	26.4	26.0	28.8

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

A. Frequency polygon

B. Pie chart

C. Broken line graph

D. Stem-and-leaf diagram

20. David applied for a scholarship. The table below shows the weight and his score of each judging criterion. The full marks of all criteria are equal.

	Judging Criteria			
	Interview Performance	School Results	Extra-curricular Activities	Awards
Score	25	30	15	10
Weight	5	3	1	1

Find the weighted mean score of David.

A. 2.5

B. 20

C. 24

D. 60

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

21. Express 63 as a product of prime factors.

22. A teacher used directed numbers to represent the changes of the weights of students.
For example : -5 kg represents a decrease of 5 kg in weight.

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

(i) the weight of the monitress has decreased by 2 kg ;
(ii) the weight of the monitor has increased by 6 kg .

23. If $\sqrt[3]{a} = 6$, find the value of a .

24. A novel is sold at 30% off and the selling price is $\$266$. Find the marked price of the novel.

25. A department store has 180 basketballs, 210 footballs and 150 volleyballs.
Find the ratio of the number of basketballs to that of footballs to that of volleyballs.

26. The nth term of a sequence is $7 - 5n$. Find the value of the 3rd term of the sequence.

27. Write down the coefficient of x in the polynomial $7x^3 - 8x^2 - 6x + 5$.

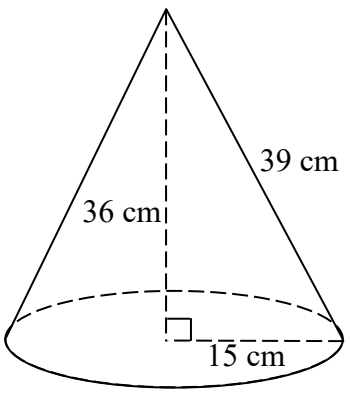
28. Expand $(x + 1)(2x - 3)$.

29. Factorise $49x^2 - 1$.

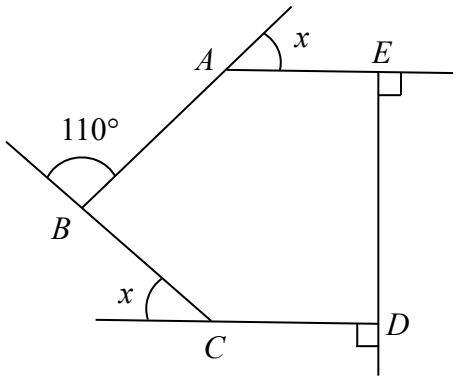
30. Consider the formula $h = \dfrac{b - a}{ak}$. If $a = 2$, $b = 5$ and $k = 9$, find the value of h.

31. Solve the inequality $-4x + 5 \leq 25$.

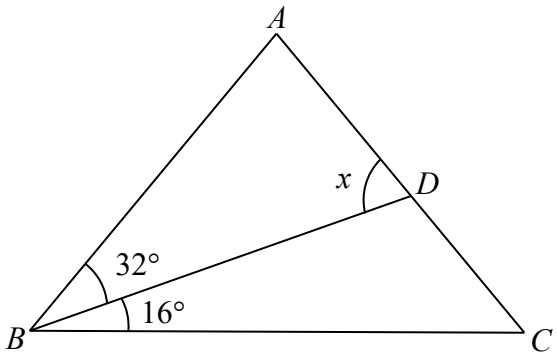
32. The figure shows a solid right circular cone. Its height, base radius and slant height are 36 cm, 15 cm and 39 cm respectively. Find the volume of the circular cone. Express the answer in terms of π.



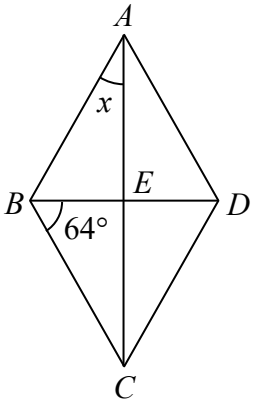
33. The figure shows pentagon $ABCDE$ and its exterior angles. Find x.



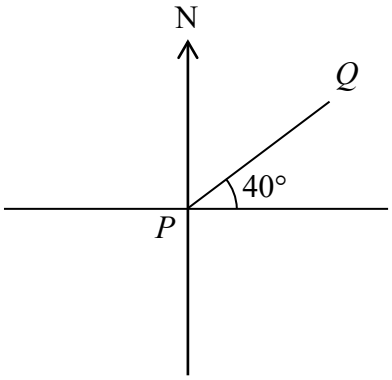
34. In the figure, ADC is a straight line. $\triangle ABC$ is an isosceles triangle with $AB = AC$. $\angle ABD = 32°$, $\angle CBD = 16°$ and $\angle ADB = x$. Find x.



35. In the figure, $ABCD$ is a rhombus. E is the point of intersection of the diagonals AC and BD. Find x.



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



37. The stem-and-leaf diagram below shows the sale of hamburgers at each branch of a fast-food chain yesterday.

The sale of hamburgers at each branch yesterday

Stem (10)	Leaf (1)					
5	2	3	3			
6	0	0	0	1	5	7
7	0	0	2	6		
8	0	8				
9	1	3	5			

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

(a) How many branches does the fast-food chain have ?

(b) How many hamburgers did the highest-selling branch of the fast-food chain sell ?

(c) Find the mode of the sale of hamburgers at each branch of the fast-food chain yesterday.

38. The following data shows the scores of 10 basketball players in a competition.

9 26 14 14 27 16 22 12 26 14

Find the mean and the median of the above data.

39. The following table shows the number of movies that 30 respondents watched during the summer holiday.

Number of movies	0	1	2	3	4 or more
Frequency	3	10	12	4	1

According to the table above, find the relative frequency of the respondents who did not watch any movies during the summer holiday.

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. Jackie went to a store to buy 1 pack of biscuits, 1 pack of chocolates and 1 bottle of juice, priced at \$29.8 , \$38.8 and \$24.1 respectively. She found that she only had \$100.

Based on the description above, give an appropriate approximation for each **UNDERLINED VALUE**. Hence, estimate the total amount of these 3 items. Explain whether Jackie had enough money to buy all 3 items.

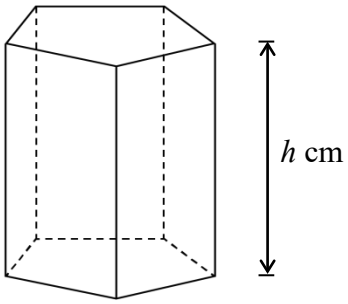
41. The nutrition label on a box of lemon tea shows that there is 5 g of sugar per 100 ml . If the capacity of the box of lemon tea is 250 ml , find the weight of sugar in the box of lemon tea.

42. Complete the table for the equation $2x + 3y - 3 = 0$ in the **ANSWER BOOKLET**.

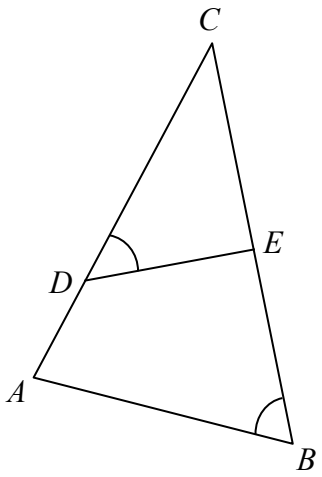
x	-3	0	3
y		1	

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

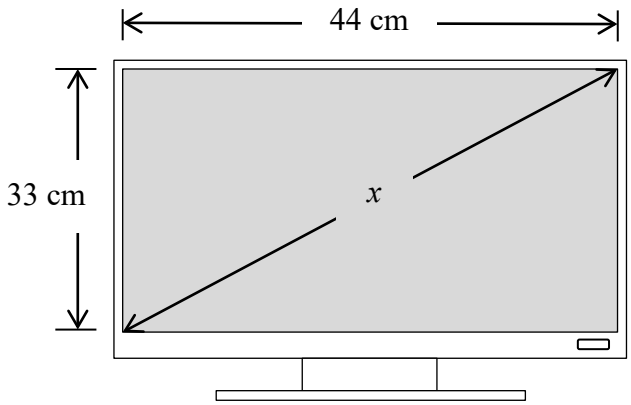
43. The figure shows a right prism. Its volume is 288 cm^3 and its base area is 12 cm^2 .
The height of the prism is h cm . Find the value of h .



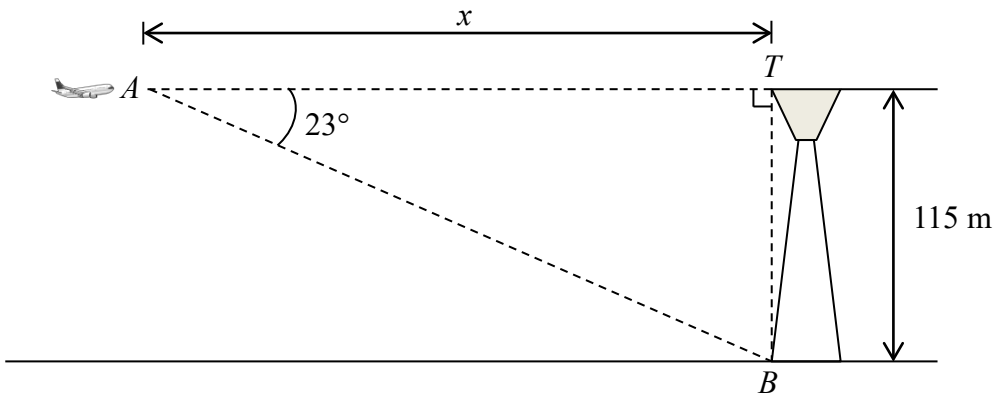
44. In the figure, ADC and CEB are straight lines, $\angle ABC = \angle EDC$.
Prove that $\triangle ABC \sim \triangle EDC$.



45. The figure shows a television with a rectangular screen. The width, height and the length of the diagonal of the screen are 44 cm, 33 cm and x respectively. Find x.



46. The figure shows an airport control tower TB. An aeroplane is located at point A. Point A and point T are at the same height. The angle of depression of point B from point A is $23°$, $AT \perp TB$ and $TB = 115$ m.



Find the horizontal distance x between the aeroplane and the control tower, correct to 3 significant figures.

47. The table below shows the number of voluntary services participated in by 40 volunteer team members in the last school year.

Number of voluntary services	1 – 2	3 – 4	5 – 6	7 – 8	9 – 10
Frequency	15	14	3	6	2

(a) According to the above table, complete the frequency distribution table in the **ANSWER BOOKLET**.

(b) Find the mean of the number of voluntary services participated in by 40 volunteer team members in the last school year.

END OF PAPER

Do not write on this page.

Answers written on this page will not be marked.