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Education Bureau

Territory-wide System Assessment 2024

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. Which of the following is the prime factorisation of 54 ?

A. 6×9

B. $3^2 \times 6$

C. $1 \times 2 \times 3^3$

D. 2×3^3

2. Round off 40 780 to 2 significant figures.

A. 40 000

B. 40 700

C. 40 800

D. 41 000

3. $(-x)^2 + (-x^2) =$

A. 0 .

B. $-x^4$.

C. $2x^2$.

D. $-2x^2$.

4. Which of the following statements is correct ?

A. The solution of $2x+1=0$ is $\frac{1}{2}$.

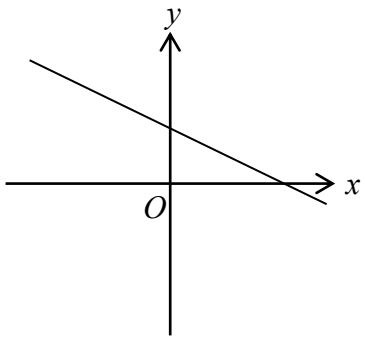
B. The solution of $x+\frac{1}{2}=0$ is $\frac{1}{2}$.

C. The solution of $2x-1=0$ is $\frac{1}{2}$.

D. The solution of $-\frac{1}{2}-x=0$ is $\frac{1}{2}$.

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

A.



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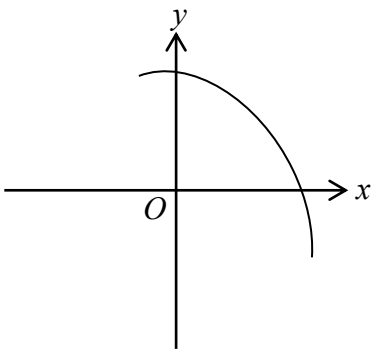

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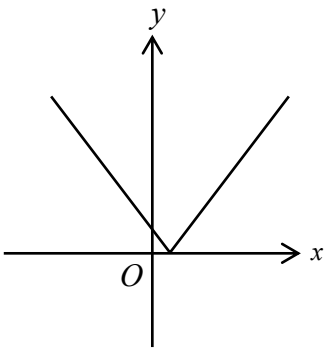

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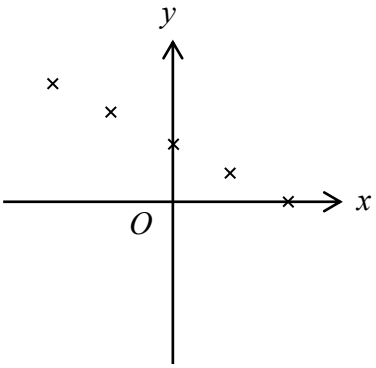


6. The number of \$2 coins and \$5 coins in a cash box are x and y respectively. The total amount of the coins is \$300. It is given that the number of \$5 coins is 11 more than that of \$2 coins. Which of the following pairs of simultaneous equations shows the relations between x and y?

A. $\begin{cases} x+y=300 \\ x=11+y \end{cases}$

B. $\begin{cases} x+y=300 \\ y=11+x \end{cases}$

C. $\begin{cases} 2x+5y=300 \\ x=11+y \end{cases}$

D. $\begin{cases} 2x+5y=300 \\ y=11+x \end{cases}$

7. $5^{-2} =$

A. $\frac{1}{25}$.

B. -25.

C. $\frac{1}{10}$.

D. -10.

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

(i)	$(3x-1)(x-2)(x+4)$ $=3x^3+5x^2-26x+8$	(ii)	$3x^3+5x^2-26x+8$ $=(3x-1)(x-2)(x+4)$

A. (i) Expansion (ii) Expansion

B. (i) Factorisation (ii) Expansion

C. (i) Expansion (ii) Factorisation

D. (i) Factorisation (ii) Factorisation

9. $x+\frac{1}{3x}=$

A. $\frac{1}{3}$.

B. $\frac{x+1}{3x}$.

C. $\frac{3x^2+1}{3x}$.

D. $\frac{9x^2+1}{3x}$.

10. If $x \leq 5$, which of the following **CANNOT** be a value of x ?

A. -5

B. 0

C. 5

D. 6

11. Kenny weighs 72 kg (correct to the nearest kg). Which of the following could be his actual weight ?

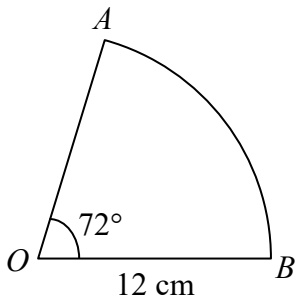
A. 71.4 kg

B. 71.5 kg

C. 72.5 kg

D. 72.6 kg

12. In the figure, the radius of sector OAB is 12 cm and $\angle AOB = 72°$. Find the area of the sector. Give the answer correct to 3 significant figures.



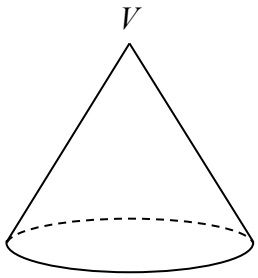
A. $7.54\ \text{cm}^2$

B. $15.1\ \text{cm}^2$

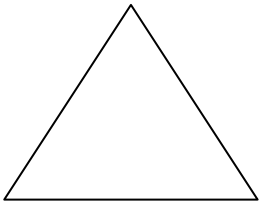
C. $90.5\ \text{cm}^2$

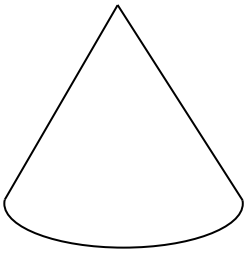
D. $181\ \text{cm}^2$

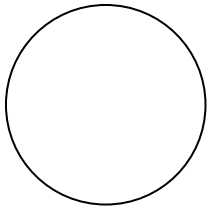
13. A regular circular cone is placed horizontally as shown. Stephen sketches a section which is perpendicular to the base and passing through vertex V.

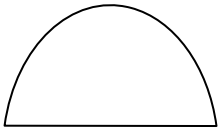


Which of the following can be the plane diagram of the section?

A. 

B. 

C. 

D. 

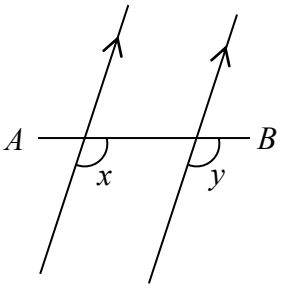
14. In the figure, AB is a straight line. x and y are

A. alternate interior angles.

B. vertically opposite angles.

C. corresponding angles.

D. interior angles on the same side.



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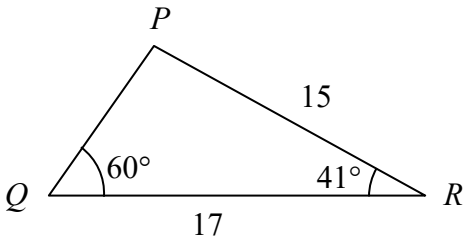
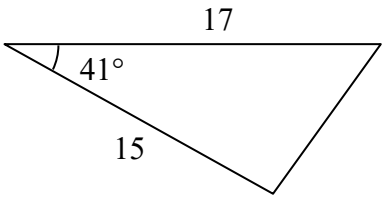


Which of the following triangles **MAY NOT** be congruent to $\triangle PQR$ shown above?

A.



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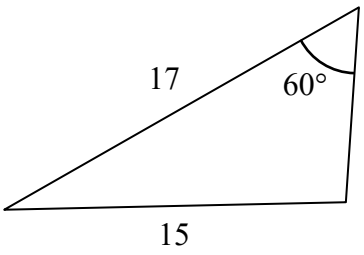

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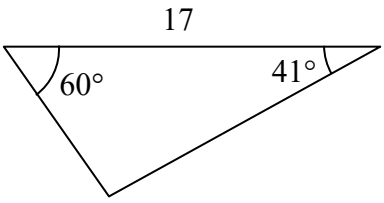
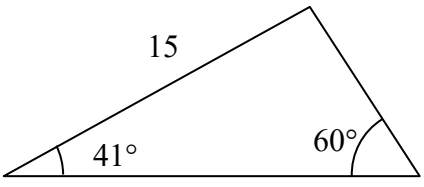
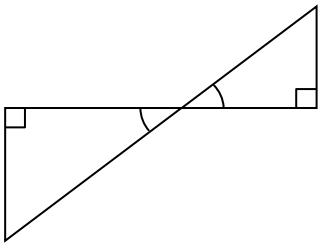


D.



16. Which of the following pairs of triangles must **NOT** be similar?

A.



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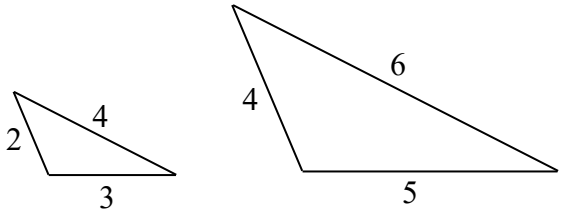

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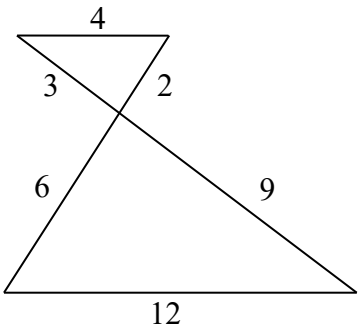
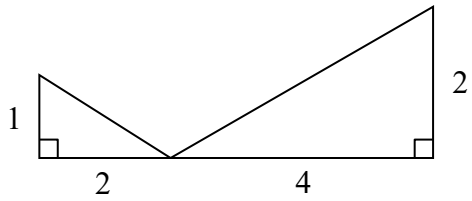


D.



17. In the rectangular coordinate plane, $A\,(4, 8)$ and $B\,(12, 6)$ are two points on a straight line L. The slope of L =

A. $\dfrac{8-6}{12-4}$.

B. $\dfrac{6-8}{12-4}$.

C. $\dfrac{12-6}{4-8}$.

D. $\dfrac{12-4}{6-8}$.

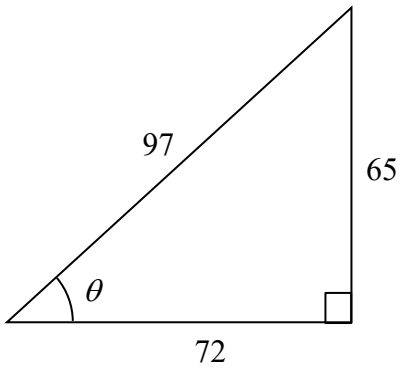
18. Find the value of $\cos\theta$ in the figure.

A. $\frac{72}{65}$

B. $\frac{72}{97}$

C. $\frac{65}{72}$

D. $\frac{65}{97}$



19. The table below shows the sale proportions of different types of set lunch sold in a school tuck shop on a day.

Type of set lunch	Proportion of total number of set lunches sold
A	20%
B	26%
C	19%
D	28%
E	7%

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

A. Pie chart

B. Histogram

C. Stem-and-leaf diagram

D. Cumulative frequency polygon

20. A university conducted a test for dehumidifiers. The table below shows the score and the weight of each testing criterion for a model of dehumidifier.

	Testing criterion			
	Daily dehumidification capacity	Energy efficiency	Sound level	Air purification performance
Score	87	94	69	50
Weight	40	40	10	10

Find the weighted mean score of the model of dehumidifier.

A. 25

B. 28.1

C. 75

D. 84.3

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

21. Express $11 \times 11 \times 11$ as a power .

22. A country used directed numbers to represent the number of tourists arriving or leaving a city.
For example,
–5 000 represents that there are 5 000 tourists leaving a city.

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

(i) There are 8 000 tourists arriving in city A.
(ii) There are 2 000 tourists leaving city B.

23. If $\sqrt{a} = 16$, find the value of a .

24. The cost of a tablet computer is \$5 200 . If it is sold at a loss of 25% , find the selling price of the tablet computer.

25. A fruit shop sold 150 apples and mangoes in total, 70 of which were mangoes. Find the ratio of the number of apples to the number of mangoes sold.

26. The nth term of a sequence is $\frac{n+1}{n+2}$. Find the value of the 5th term of the sequence.

27. Write down the power of the polynomial $5x^3 - 8x^2 + 9x - 7$.

28. Expand $(x + 2)(3x - 5)$.

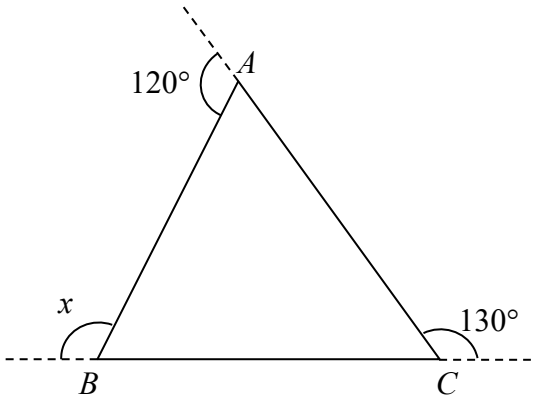
29. Factorise $x^2 - 2x + 1$.

30. Consider the formula $a = \frac{f^2}{m+n}$. If $f = 5$, $m = 9$ and $n = 3$, find the value of a .

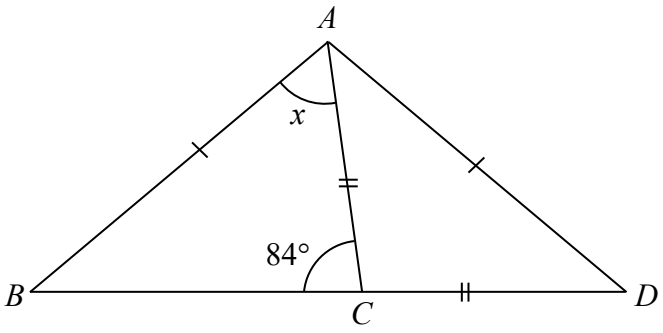
31. Solve the inequality $2x \leq -8$.

32. The height of a right prism is 12 cm . The base of the right prism is a parallelogram. The base and the height of the parallelogram are 15 cm and 10 cm respectively. Find the volume of the prism.

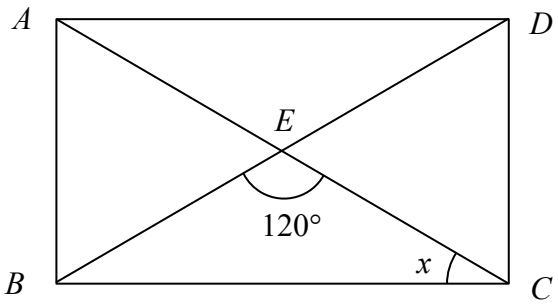
33. The figure shows $\triangle ABC$ and its exterior angles . Find x .



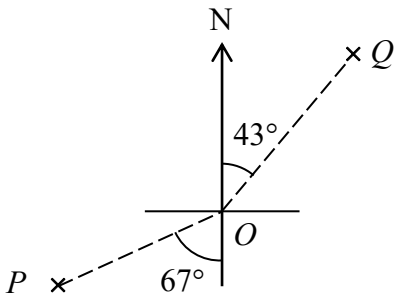
34. In the figure, BCD is a straight line. $\triangle ABD$ and $\triangle CAD$ are isosceles triangles, where $AB = AD$ and $CA = CD$. It is given that $\angle ACB = 84°$. Find x .



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



36. In the figure, the bearing of P from O is S 67° W. Find the bearing of Q from O.



37. The stem-and-leaf diagram below shows the scores a basketball team got in each match last year.

Scores of a basketball team got in each match last year

Stem (10)	Leaf (1)
4	0 3
5	4 7 9 9
6	1 2 4 6 8 8 8
7	1 3 3 7 9
8	0 8

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

(a) How many matches did the basketball team play last year?

(b) What was the lowest score the basketball team got in the matches last year?

(c) Find the median score the basketball team got in the matches last year.

38. The following data shows the results (m) of 8 athletes in a long jump competition.

3.5, 3.6, 4.2, 4.4, 4.8, 5.3, 3.5, 3.5

Find the mean and the median of the above data.

39. Wilson throws three coins at the same time. He conducted this experiment 100 times and the outcomes are shown as follows:

Outcome	No coins face up	Only 1 coin faces up	Only 2 coins face up	3 coins face up
Frequency	9	43	40	8

Find the relative frequency of Wilson having 2 coins facing up only.

Go on to the next page

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. Mr Chan plans to spend 500 to buy 3 gifts. The prices of the gifts are $\$\underline{202}$, $\$\underline{256}$ and $\$\underline{101}$ respectively.
Based on the description above, give an appropriate approximation for each **UNDERLINED VALUE**. Hence, estimate the total amount spent buying the gifts. Briefly, explain whether Mr Chan has enough money to buy these 3 gifts.

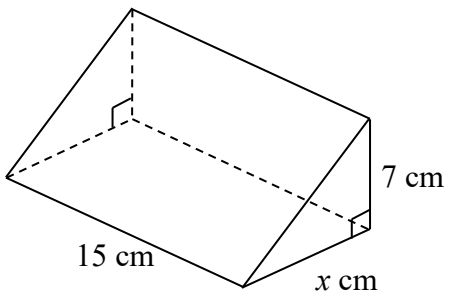
41. It is given that 0.05 L of paint can cover an area of $1\ m^2$. Mr Lam wants to paint a wall with a total area of $150\ m^2$. The capacity of a tin of paint is 1.25 L. How many tin(s) of paint does he need ?

42. Complete the table for the equation $y = \dfrac{3x-8}{4}$ in the **ANSWER BOOKLET**.

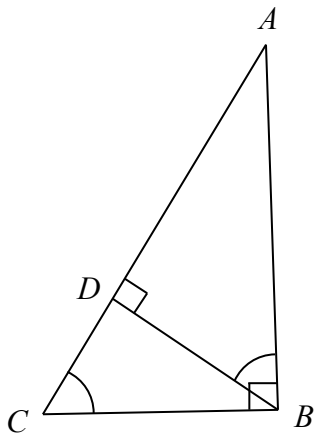
x	-4	0	4
y		-2	

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

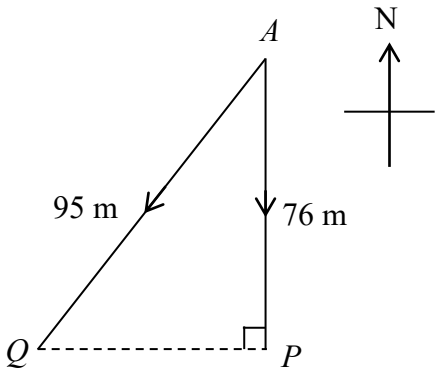
43. In the figure, the base of a right triangular prism is a right-angled triangle. The volume of the prism is $420\ cm^3$. Find the value of x.



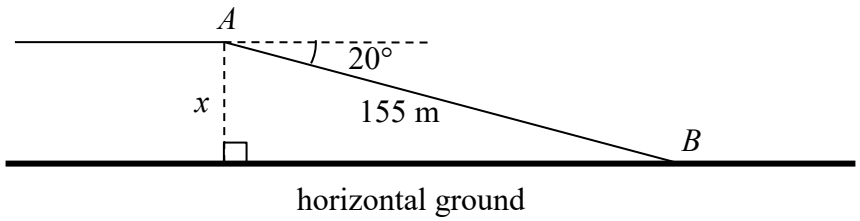
44. In the figure, ADC is a straight line. $\triangle ABC$ is a right-angled triangle, where $\angle ABC$ is the right angle. It is given that $AC \perp BD$ and $\angle ACB = \angle ABD$. Prove that $\triangle ABC \sim \triangle ADB$.



45. Kelly walks due south for 76 m from A to P while John walks 95 m from A to Q. If Q is due west to P, find the distance between P and Q.



46. In the figure, a roller coaster train travels from point A to point B which is on the horizontal ground. The distance between point A and point B is 155 m. The angle of depression of point B from point A is $20°$. It is given that the vertical distance between point A and the horizontal ground is x. Find x. Give the answer correct to 3 significant figures.



47. The table below shows the distribution of weight (kg) of 40 watermelons.

Weight (kg)	3.0 – 3.9	4.0 – 4.9	5.0 – 5.9	6.0 – 6.9
Frequency	4	8	16	12

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

(b) Find the mean weight of these 40 watermelons.

END OF PAPER

Do not write on this page.

Answers written on this page will not be marked.

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