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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. Find the least common multiple (L.C.M.) of $2^2 \times 7$ and $2^3 \times 7^2$.

A. $2^2 \times 7$

B. $2^3 \times 7^2$

C. $2^5 \times 7^3$

D. $2^6 \times 7^2$

2. Which of the following is an irrational number?

A. 0.33

B. $0.\dot{1}$

C. $\frac{5}{11}$

D. $\sqrt{8}$

3. Matthew got 80 marks in a mathematics test. He got 4 marks less than Lily. Find the ratio of Matthew's mark to Lily's mark in the test.

A. 19 : 20

B. 20 : 19

C. 21 : 20

D. 20 : 21

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

A. 0 .

B. $-x^4$.

C. $2x^2$.

D. $-2x^2$.

5. There are 25 members in a school basketball team. Each member needs to pay $\$x$ to rent a basketball court for training. If 5 of them are absent from training, the rest of the team members will need to pay $\$1.5$ more. Which of the following equations can be used to find the value of x ?

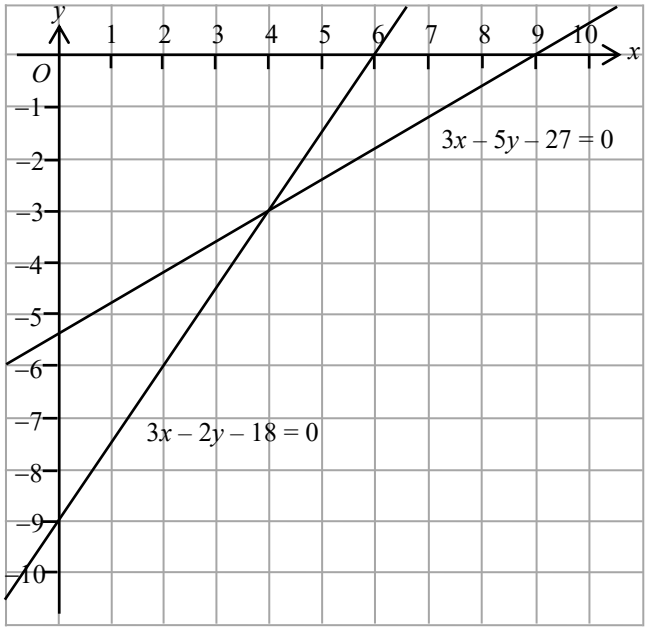
A. $25x = 20(x + 1.5)$

B. $25x = 20x + 1.5$

C. $25x = 30(x + 1.5)$

D. $25(1 - 1.5x) = 20x$

6.



The above figure shows the graphs of $3x - 2y - 18 = 0$ and $3x - 5y - 27 = 0$.

According to the given graphs, solve the simultaneous equations $\begin{cases} 3x - 2y - 18 = 0 \\ 3x - 5y - 27 = 0 \end{cases}$ graphically.

A. (0, –9)

B. (4, –3)

C. (–3, 4)

D. (9, 0)

7. 2.48×10^4 =

A. 0.000 024 8 .

B. 0.000 248 .

C. 24 800 .

D. 2 480 000 .

8. Arrange the terms of the polynomial $1 + x^2 - x$ in ascending order of powers of x. Which of the following is correct ?

A. $1 - x + x^2$

B. $-x + 1 + x^2$

C. $x^2 + 1 - x$

D. $x^2 - x + 1$

9. Which of the following is an identity ?

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

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

C. $(2x - 3) - (2x + 3) = 0$

D. $2(x - 3) = 2x - 3$

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 ?

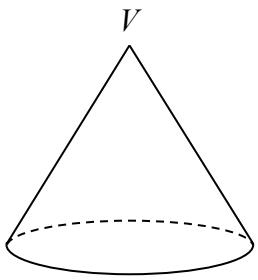
A. 71.4 kg

B. 71.5 kg

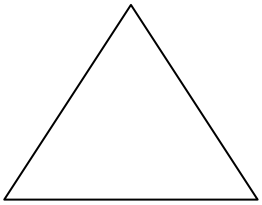
C. 72.5 kg

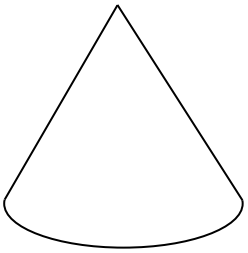
D. 72.6 kg

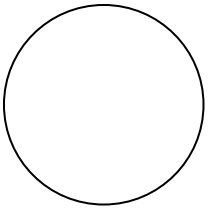
12. A regular circular cone is placed horizontally as shown. Stephen sketches a section which is perpendicular to the base and passing through vertex V.

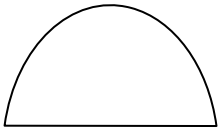


Which of the following can be the plane diagram of the section?

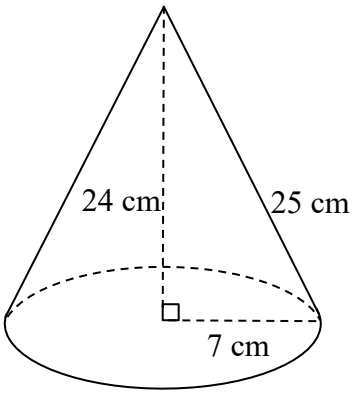
A. 

B. 

C. 

D. 

13. The figure shows a right circular cone. Its base radius, height and slant height are 7 cm , 24 cm and 25 cm respectively. Find the volume of the circular cone.



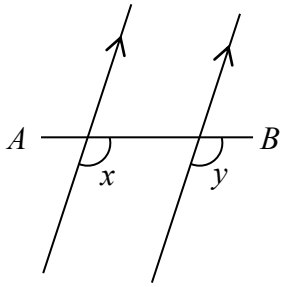
A. $\pi(7)\,(25)\ \text{cm}^3$

B. $\pi(7)^2\,(24)\ \text{cm}^3$

C. $\frac{1}{3}\pi(7)^2\,(24)\ \text{cm}^3$

D. $\frac{4}{3}\pi(7)^3\ \text{cm}^3$

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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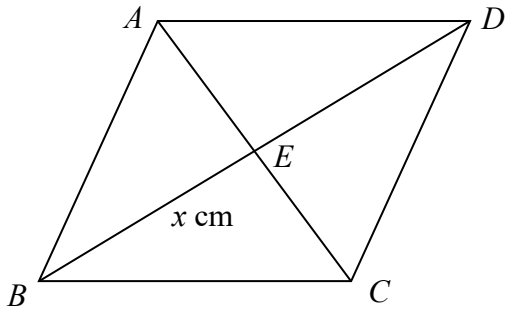
15. In the figure, $ABCD$ is a parallelogram. E is the point of intersection of the diagonals AC and BD. It is given that $AB = 11$ cm, $AC = 12$ cm and $BD = 16$ cm. If $BE = x$ cm, find the value of x.

A. 5

B. 6

C. 8

D. 11



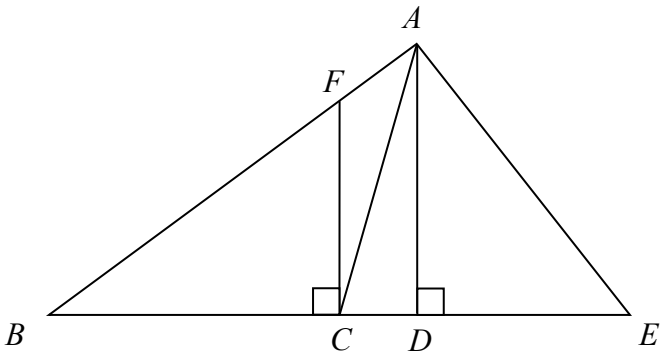
16. In $\triangle ABE$, AFB and $BCDE$ are straight lines. It is given that $BC = CE$, $FC \perp BE$ and $AD \perp BE$. Which of the following is a perpendicular bisector of $\triangle ABE$?

A. AD

B. AC

C. FC

D. BC



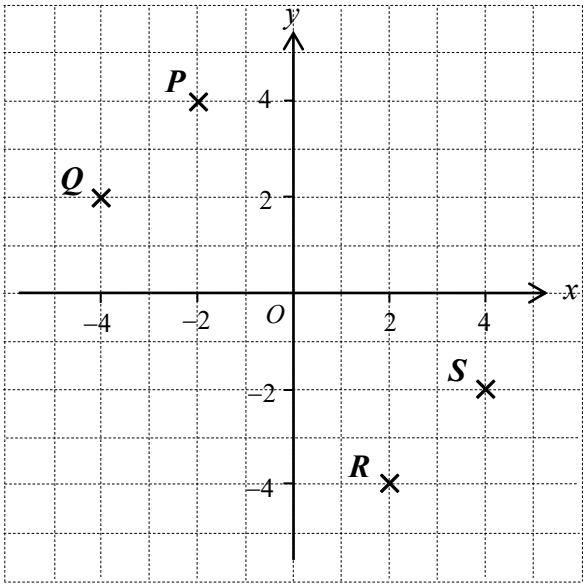
17. In the figure, which point can be represented by $(4, -2)$?

A. P

B. Q

C. R

D. S



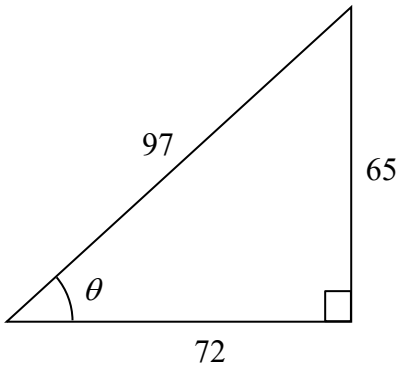
18. Find the value of $\cos\theta$ in the figure.

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

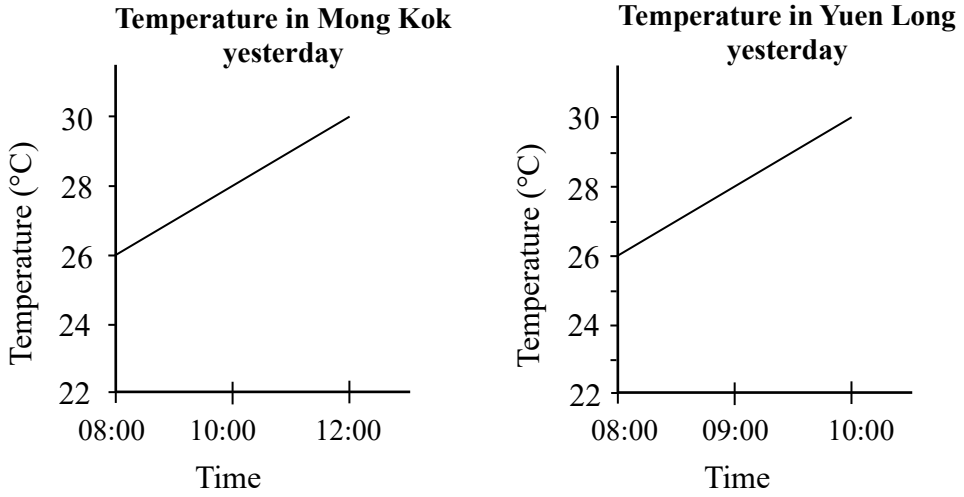
B. $\frac{72}{97}$

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

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



19. The charts below show the temperatures in Mong Kok and Yuen Long yesterday. Hence, Sam claims that the temperatures raised at the same rate in Mong Kok and Yuen Long yesterday.



Which of the following statements is the best reason that Sam is **misled** by the above charts?

A. There is no comparison with the temperatures of other regions.

B. The scales of the horizontal axis in the two charts are not the same.

C. The scales of the vertical axis in the two charts are not the same.

D. The scales of the vertical axis in the two charts do not start from 0.

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. 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.

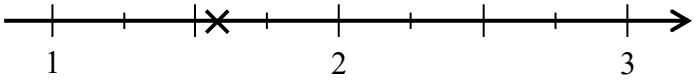
Use a directed number to represent each of the following situations.

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

22. Round off 0.051 54 to 2 decimal places.

23. Use the symbol '×' to mark the number $\sqrt{7}$ on the number line given in the **ANSWER BOOKLET**.

Example : 1.6 is marked on the number line below.



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. Find the value of x in the following sequence of square numbers.

$$1\,,\quad 4\,,\quad 9\,,\quad 16\,,\quad x\,,\ldots$$

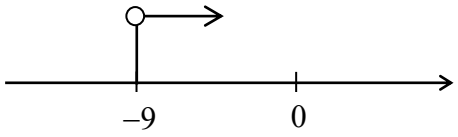
26. Expand $2x\,(x - 9y - 1)$.

27. Expand $(6x + 1)(6x - 1)$.

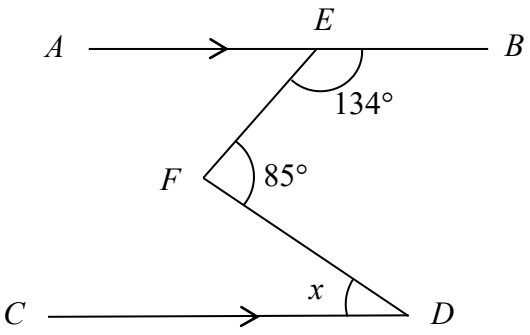
28. Simplify $\left(\frac{5y}{2x}\right)\left(\frac{5x}{2y}\right)$.

29. Make H the subject of the formula $G = 3H + 4$.

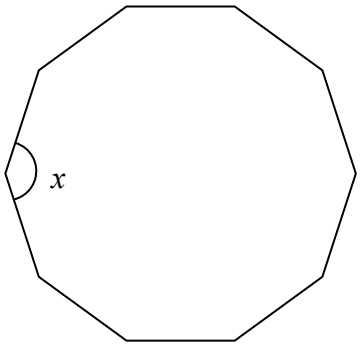
30. According to the diagram, write down an inequality in x .



31. In the figure, AEB is a straight line. It is given that $AB \,//\, CD$, $\angle BEF = 134°$ and $\angle EFD = 85°$. Find x .

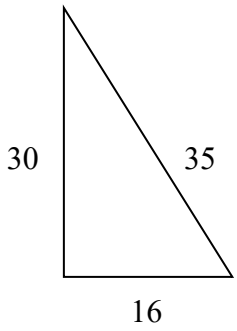


32. The figure shows a regular 10-sided polygon. Find x.

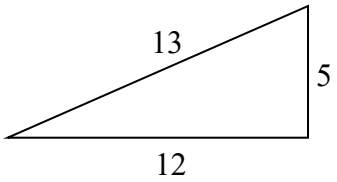


33. Which of the following must be right-angled triangle(s)? (May be more than one answer)

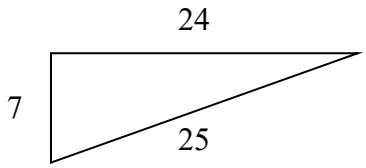
Triangle P



Triangle Q

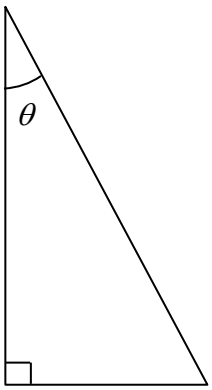


Triangle R



34. Find the distance between two points $A\ (0, -3)$ and $B\ (-5, 9)$ in the rectangular coordinate plane.

35. In the figure, $\tan\theta = 0.566$. Find θ. Give the answer correct to 3 significant figures.

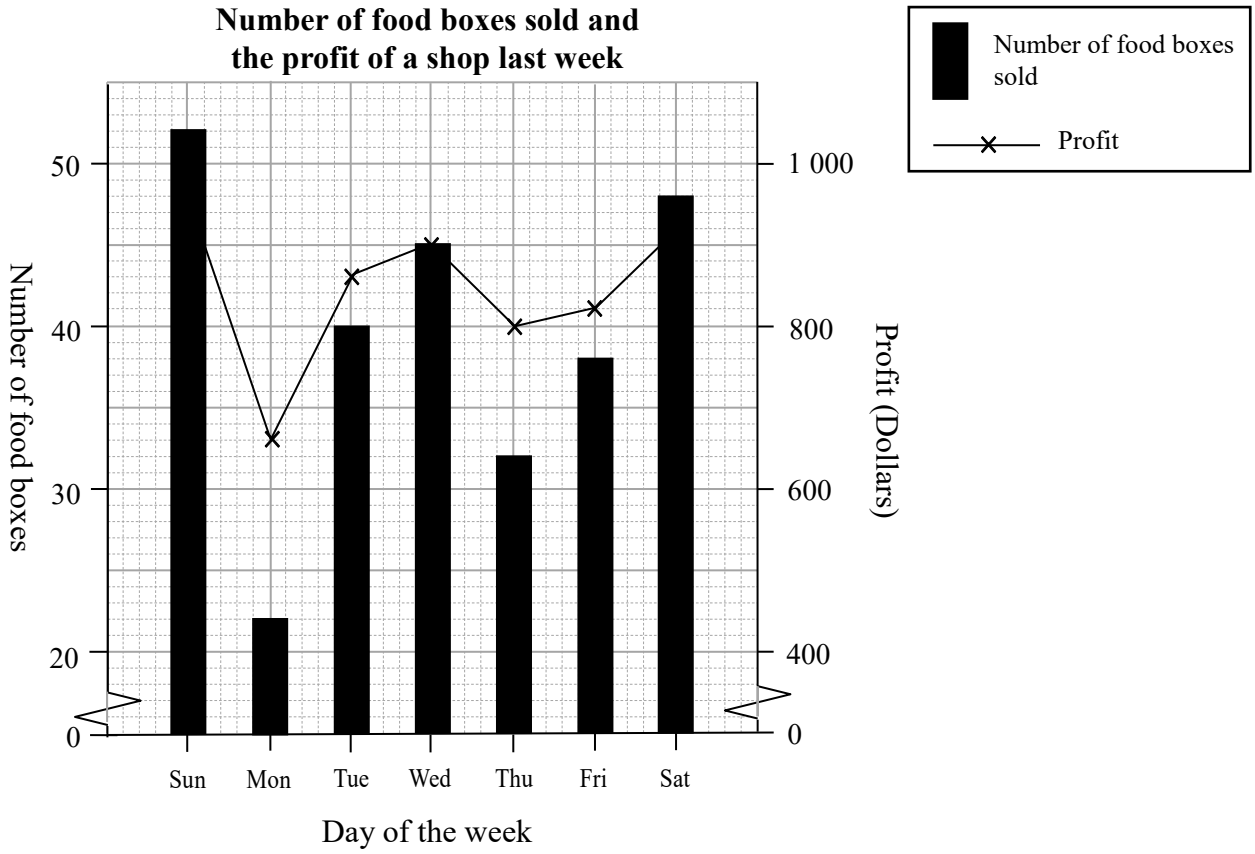


36. The following data shows the number of push-ups done by 20 students in one minute.

45	34	35	41	33
27	43	48	49	41
51	24	57	18	10
37	44	47	20	58

Use the data to complete the two frequency distribution tables in the **ANSWER BOOKLET**.

37. The diagram below shows the number of food boxes sold and the profit of a shop last week.



According to the above diagram, answer the following questions.

(a) What was the total profit from the food boxes sold last week?

(b) What was the mean profit of each food box sold last Thursday?

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. The table below shows the distribution of the prices of 30 tablet computers.

Price ($)	2 000 – 3 999	4 000 – 5 999	6 000 – 7 999	8 000 – 9 999	10 000 – 11 999
Frequency	11	8	5	4	2

Find the modal class of the prices of these 30 tablet computers.

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.

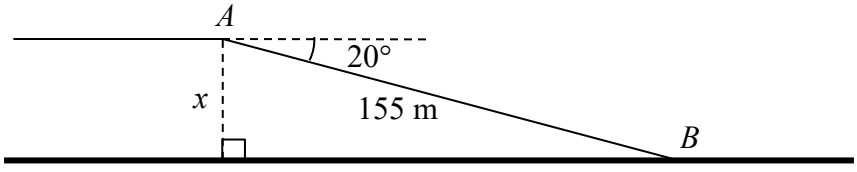
40. Winnie deposits \$7 500 in a bank and the interest rate is 4% p.a. **compounded** yearly. Find the interest she will receive after 2 years.

41. Complete the table for the equation $3x - 4y - 8 = 0$ in the **ANSWER BOOKLET**.

x	-4	0	4
y		-2	

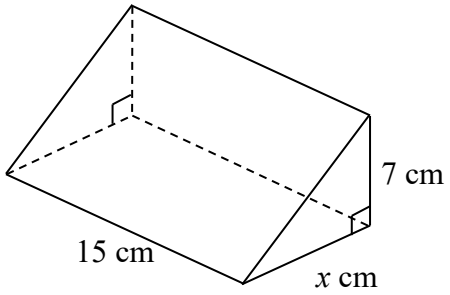
According to the table, plot the graph of this equation on the rectangular coordinate plane given in the **ANSWER BOOKLET**.

42. 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.

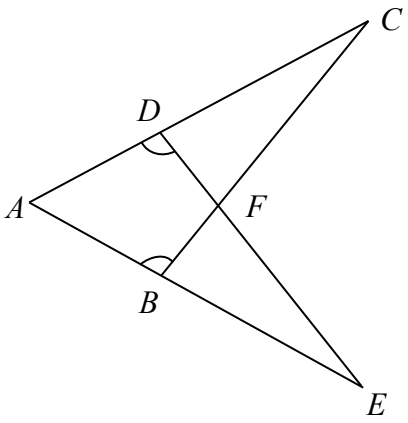


horizontal ground

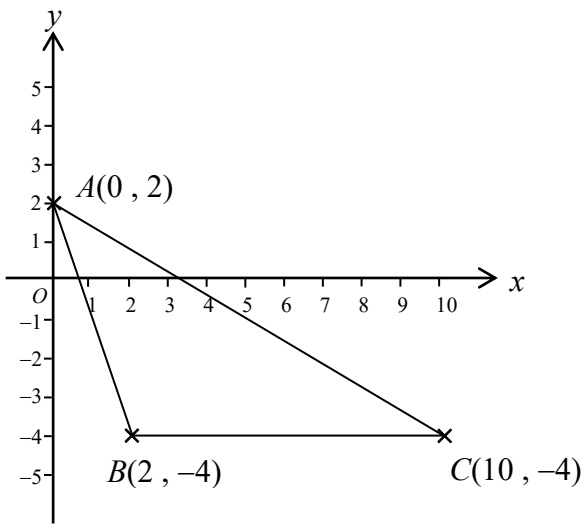
43. In the figure, the base of a right triangular prism is a right-angled triangle. The volume of the prism is $420\ \text{cm}^3$. Find the value of x.



44. In the figure, ABE, ADC, BFC and DFE are straight lines. It is given that $AB = AD$ and $\angle ABC = \angle ADE$. Prove that $\triangle ABC \cong \triangle ADE$.



45. Find the area of $\triangle ABC$ in the figure.



46. Solve the simultaneous equations $\begin{cases} 2x+5y=6 \\ x-5y=18 \end{cases}$.

47. Kelvin attempts two multiple-choice questions. For each question, there are three options A, B and C with one correct answer only.

(a) Some of the possible outcomes are given in the table provided in the **ANSWER BOOKLET**. Fill the rest of the possible outcomes in the blanks.

(b) The correct answers for the two questions are both option C. If Kelvin picks one option as his answer for each question randomly, find the probability that Kelvin can answer at least one question correctly.

END OF PAPER

Do not write on this page.

Answers written on this page will not be marked.