9	M	E	4	(	Q	)

Education Bureau

Territory-wide System Assessment 2010

Secondary 3

Mathematics

QUESTION BOOKLET

INSTRUCTIONS

1. There are 51 questions in this paper.
2. The 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

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	=	$\frac{1}{3}\pi r^2 h$
Prism	Volume	=	base area × height
Pyramid	Volume	=	$\frac{1}{3}$ × base area × height

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

1. The moon was formed approximately 4 600 000 000 years ago. Use scientific notation to represent this number.

A. 4.6×10^{8}
B. 4.6×10^{9}
C. 46×10^{8}
D. 46×10^{9}

2. Which of the following numbers is closest to 14?

A. $\sqrt{28}$
B. $\sqrt{140}$
C. $\sqrt{170}$
D. $\sqrt{200}$

3. $a^2 + a^2 =$

A. $2a^2$.
B. a^4.
C. $2a^4$.
D. $(2a)^2$.

4. Which of the following is a polynomial?

A. $\frac{x^2}{2y} - 3$
B. $\frac{x^2 - 2y}{3}$
C. $x^2 - 2\sqrt{y}$
D. $2^x - 2y$

5. Find the constant term of the polynomial $-5-3x$.

A. 3
B. -3
C. 5
D. -5

6. $(-3)^3 =$

A. -9.
B. $-\frac{1}{9}$.
C. -27.
D. $-\frac{1}{27}$.

7. Which of the following statements is **INCORRECT**?

A. The root of $x+4=5$ is 1.
B. The root of $2x+3=7$ is 2.
C. The root of $3x+2=11$ is 3.
D. The root of $4x+1=15$ is 4.

8. Which of the following points **DOES NOT** lie on the straight line $2x+y+4=0$?

A. $(2,-8)$
B. $(-2,0)$
C. $(0,-4)$
D. $(3,10)$

9. If $x > y$, which of the following inequalities is **INCORRECT**?

A. $x + y > 2y$

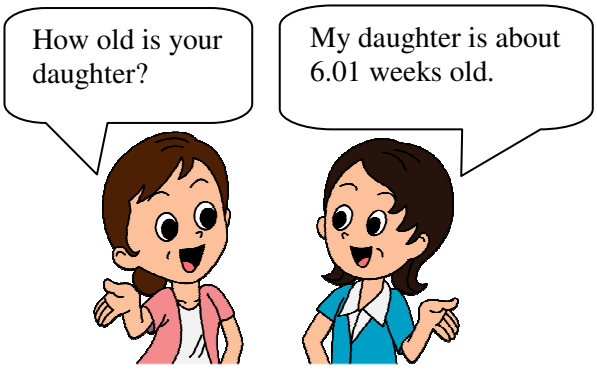
B. $2 - x < 2 - y$

C. $\frac{x}{-2} > \frac{y}{-2}$

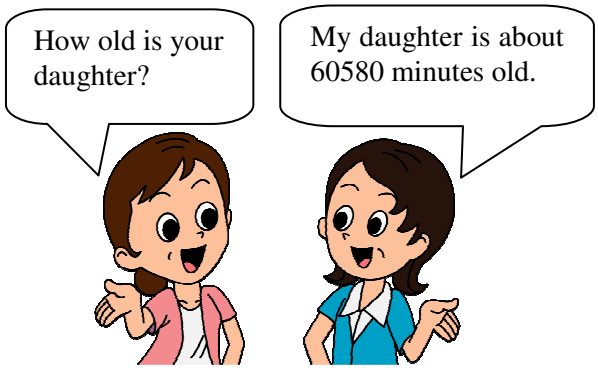
D. $2y < 2x$

10. Which of the following dialogues use the most suitable unit and degree of accuracy to express the age of Mrs Tsui's daughter?

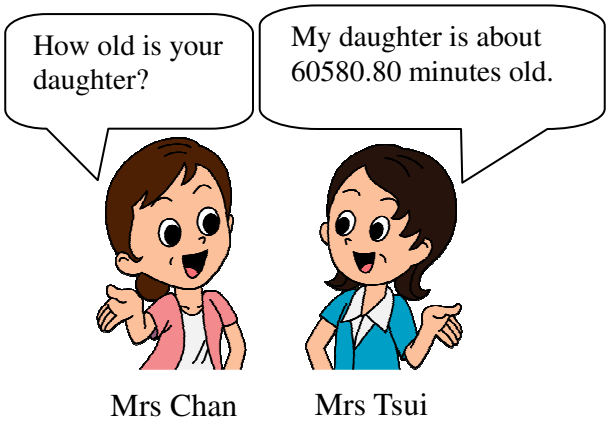
A.



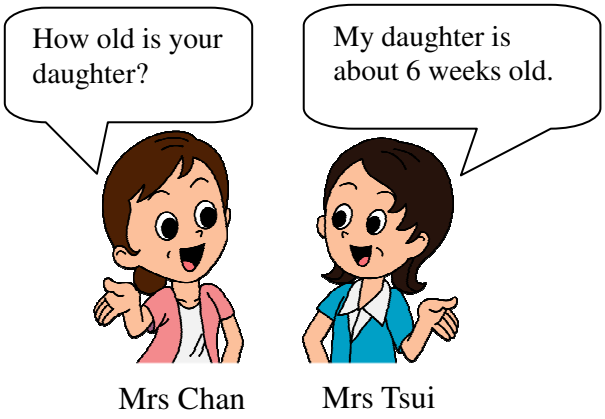
B.



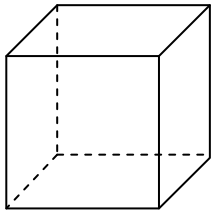
C.



D.



11. The figure shows a cube of volume 125 cm^3. Find its total surface area.



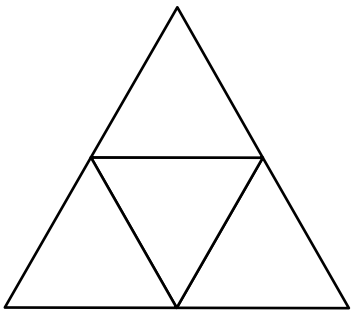
A. 150 cm^2

B. 125 cm^2

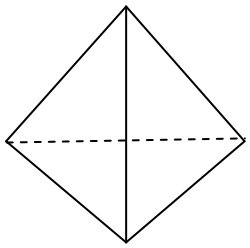
C. 75 cm^2

D. 25 cm^2

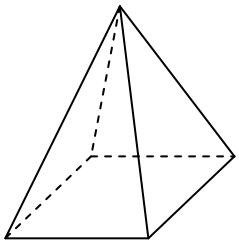
12. Which of the following 3-D figures can be made by the net on the right?



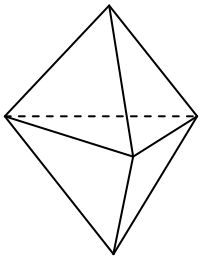
A.



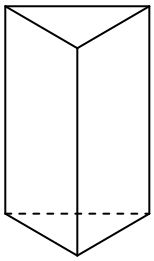
B.



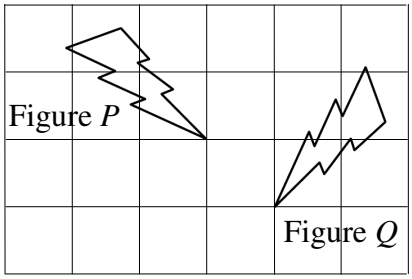
C.



D.

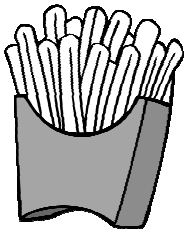


13. Figure *P* is changed to Figure *Q* after a single transformation. The transformation is



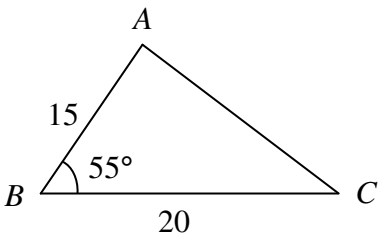
A. rotation.
B. reflection.
C. translation.
D. enlargement.

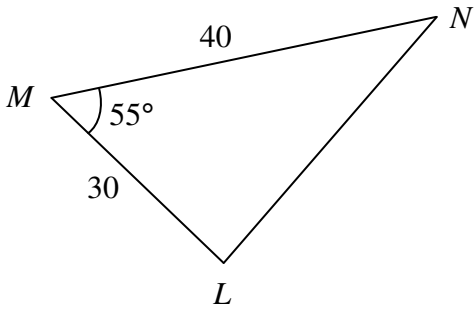
14. Will the size and shape of the figure on the right be changed after enlargement?



	Size	Shape
A.	unchanged	changed
B.	changed	changed
C.	changed	unchanged
D.	unchanged	unchanged

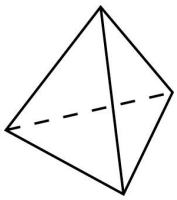
15. According to the figures below, which of the following is correct?



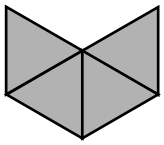


A. $\triangle ABC \cong \triangle MLN$ (SAS)
B. $\triangle ABC \cong \triangle LMN$ (SAS)
C. $\triangle ABC \sim \triangle LMN$ (Ratios of 2 sides, included angles)
D. $\triangle ABC \sim \triangle MLN$ (Ratios of 2 sides, included angles)

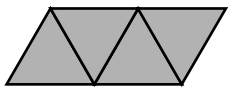
16. Which of the following nets can be folded into a regular tetrahedron?



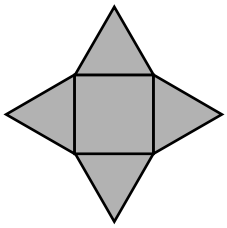
A.



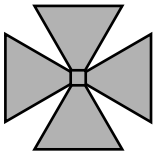
B.



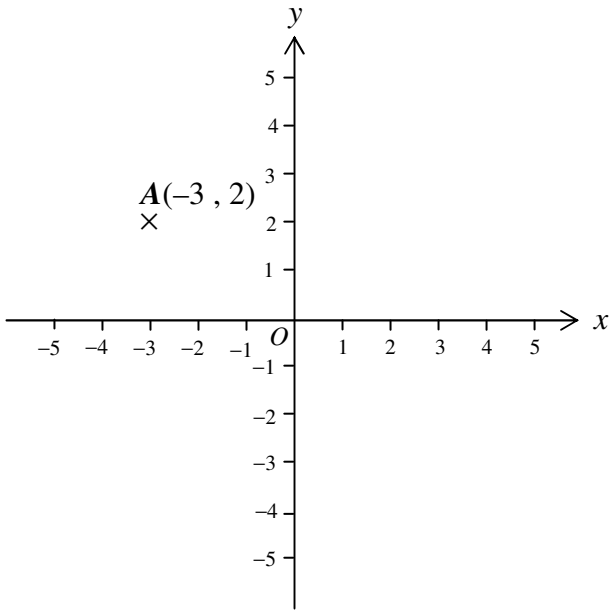
C.



D.



17. In the figure, point $A(-3 , 2)$ is rotated 180° about the origin O to the point A'. The coordinates of A' are



A. (2 , –3).
B. (3 , –2).
C. (3 , 2).
D. (2 , 3).

18. The slopes of four straight lines L_1 , L_2 , L_3 and L_4 are given in the following table:

Line	L_1	L_2	L_3	L_4
Slope	4	– 4	$-\frac{1}{4}$	4

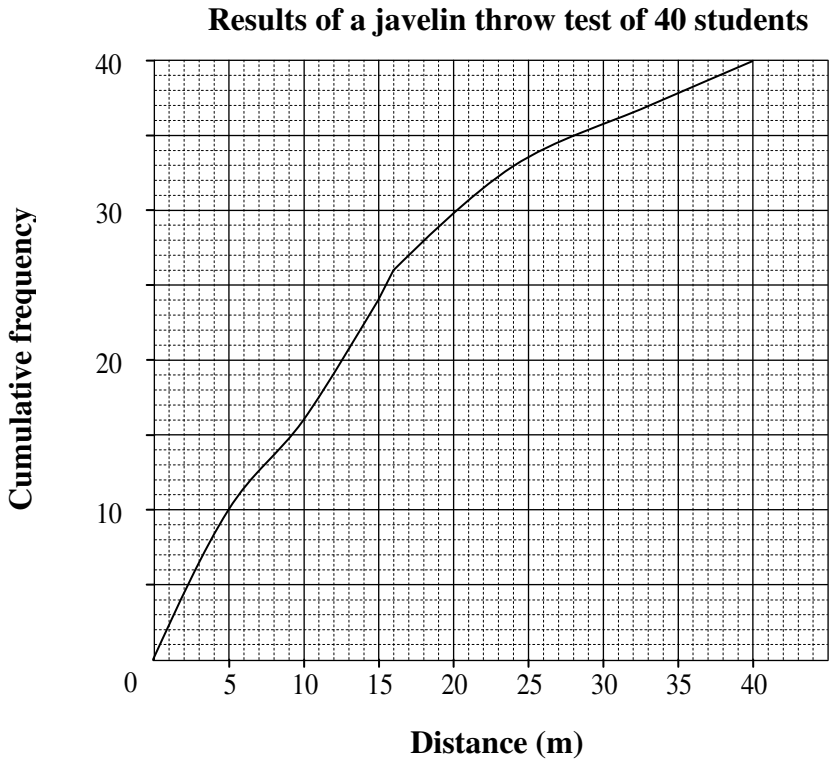
Which of the following is **WRONG** ?

A. $L_1 \perp L_3$
B. $L_1 // L_4$
C. $L_2 \perp L_3$
D. $L_3 \perp L_4$

19. Lacus and his classmates need to collect the volume of traffic of the private cars which use the Cross Harbour Tunnel from 7:00 to 9:00 on Sunday morning. Which of the following is the most suitable method to collect the data?

A. Observe and record the volume of traffic of the private cars at the entrance of the Cross Harbour Tunnel.
B. Give the questionnaires to the drivers of the private cars which use the Cross Harbour Tunnel.
C. Look at the records from the annual report of the company.
D. Interview some citizens by phone.

20. The following cumulative frequency curve shows the results of a javelin throw test of 40 students.



Students whose result reach x m can pass the test. If 60% of the students fail the test, find the value of x.

A. 10
B. 15
C. 24
D. 33

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

21. Calculate $\frac{12}{3(-2)}$.

22. In the following situations, are the values mentioned exact or estimated?

(i) The capacity of High Island Reservoir is 273 000 000 m^3.
(ii) The capacity of High Island Reservoir is 20 % more than that of Plover Cove Reservoir.

23. Determine whether a rate or a ratio should be used to relate the quantities in each of the following statements.

(i) The population of China is about 1.3 billion, while the population of the United States is about 0.3 billion.
(ii) The weight of 250 mL water is 250 g.

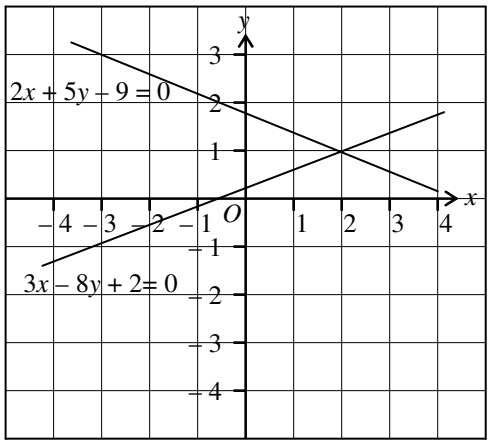
24. Martin and Joseph share a certain number of commemorative banknotes in the ratio of 4 : 9. Martin gets 28 banknotes. How many banknotes does Joseph get?

25. Rhoda has \$ A for transport expenses every month. Every day she goes to school by minibus and the fare is \$3 each time. Rhoda takes the minibus x times this month and she does not spend all the money for transport by the end of the month.
Write down an inequality to represent the relationship between x and A.

26. The n^{th} term of a sequence is $\frac{n^2+3}{2}$. Find the value of the 7^{th} term of the sequence.

27. Simplify $(2a^2+3ab)-(a^2-ab)$.

28.



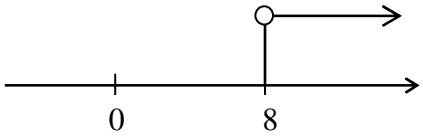
The figure shows the graphs of $2x+5y-9=0$ and $3x-8y+2=0$.

Solve $\begin{cases}2x+5y-9=0\\3x-8y+2=0\end{cases}$ graphically.

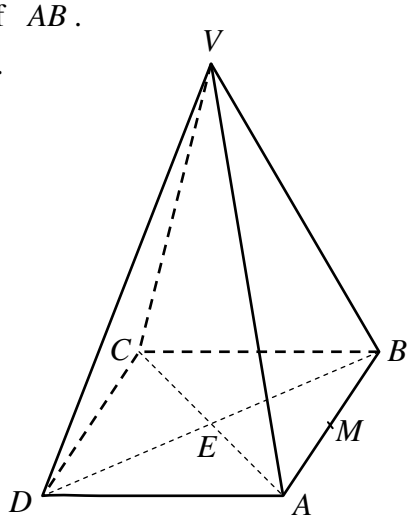
29. Expand $(2x-5)^2$.

30. Factorize $2x^2+5x-3$.

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



32. $VABCD$ is a right pyramid with a square base $ABCD$. $ABCD$ is a horizontal plane. E is the point of intersection of AC and BD. M is the midpoint of AB.
Name the angle between the plane VAB and the plane $ABCD$.



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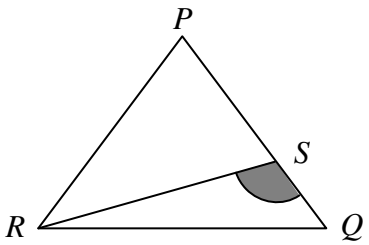
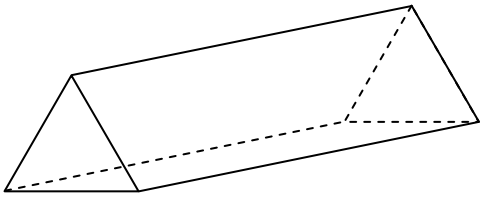
33. Use suitable notations and letters to represent the angle marked in the figure.

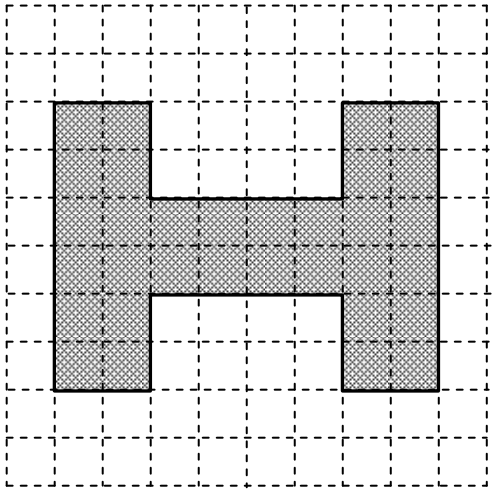


34. The figure shows the diagram of a triangular prism:

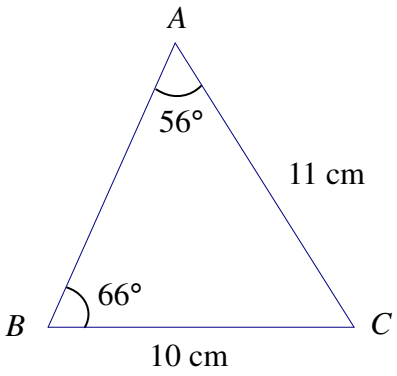


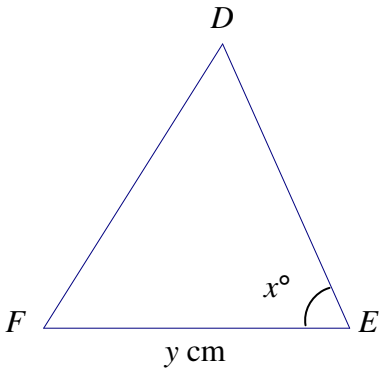
In the space provided in the **ANSWER BOOKLET,** draw a diagram of a cuboid. (Use solid lines and dotted lines to show all edges)

35. Draw **ALL** axes of symmetry of the following figure in the **ANSWER BOOKLET**.



36.



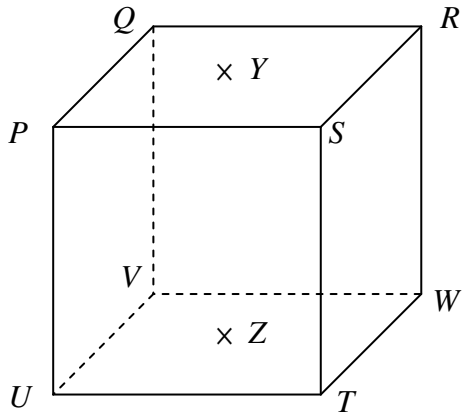


In the figure, $\triangle ABC \cong \triangle DEF$. Find

(a) the value of x;

(b) the value of y.

37. The figure shows a cube $PQRSTUVW$. Y and Z are the centres of the squares $PQRS$ and $TUVW$ respectively. Which of the following are axes of rotational symmetry of the cube? (**MORE THAN** one answer)



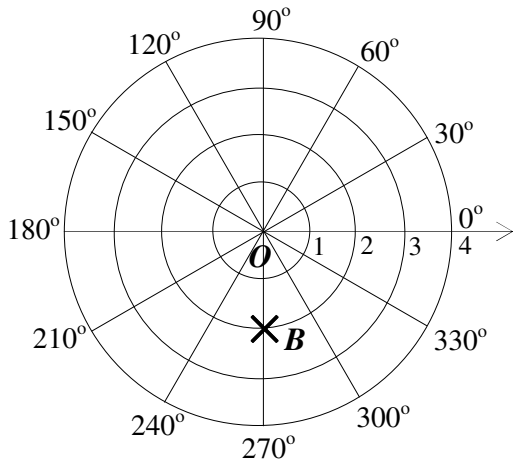
(A) YZ

(B) RV

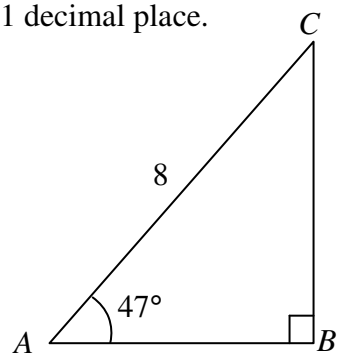
(C) QT

(D) PS

38. Find the polar coordinates of point $\boldsymbol{B}$ in the figure.

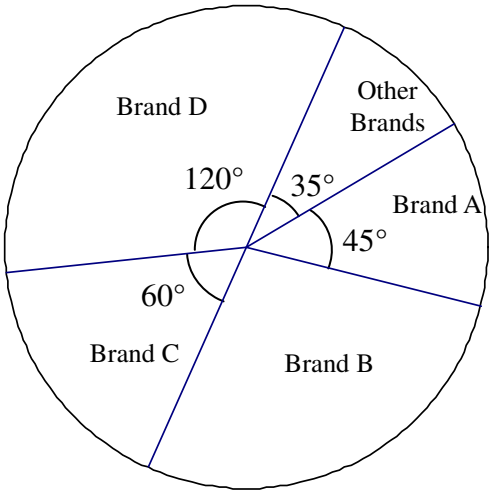


39. In the figure, find the length of AB and correct the answer to 1 decimal place.



40. The pie chart below compares the sales of milk powder of various brands from the Healthy Dispensary in June.

The sales of milk powder of various brands from the Healthy Dispensary in June



According to the pie chart, answer the following questions.

(a) Which brand of milk powder has the highest sales?

(b) If the total sales of milk powder are 720 cans, what are the sales of brand A ?

(c) If the sales of brand C are 180 cans, what are the sales of brand B ?

41. The monthly profits (in HK dollars) of Excellent Company from January to May 2010 are as follows:

53 000 , 66 000 , 73 000 , 54 000 , 64 000

Find the arithmetic mean of the monthly profits in the above period.

42. The table below shows the record of library books borrowed by students in December.

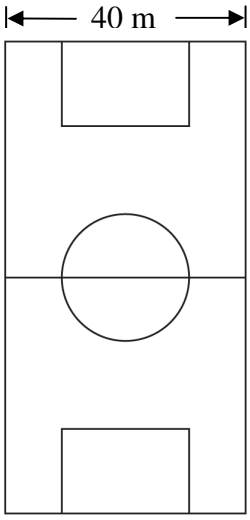
Number of books borrowed	1 – 5	6 – 10	11 – 15
Number of students	52	36	12

What is the mean number of books borrowed by each student?

43. Given that Mrs Tang has 3 children. Find the probability that Mrs Tang has only one boy.

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

44. The ratio of the length of a football field to its width is 5 : 2. If the width is 40 m, find the area of the football field.



45. Simplify $\frac{x^{-2}}{(y^2)^3}$ and express the answer with positive indices.

46. Complete the table for the equation $y = \frac{2-x}{2}$ in the **ANSWER BOOKLET**.

x	-2	0	2
y		1	

Draw the graph of this equation on the rectangular coordinate plane given in the **ANSWER BOOKLET**.

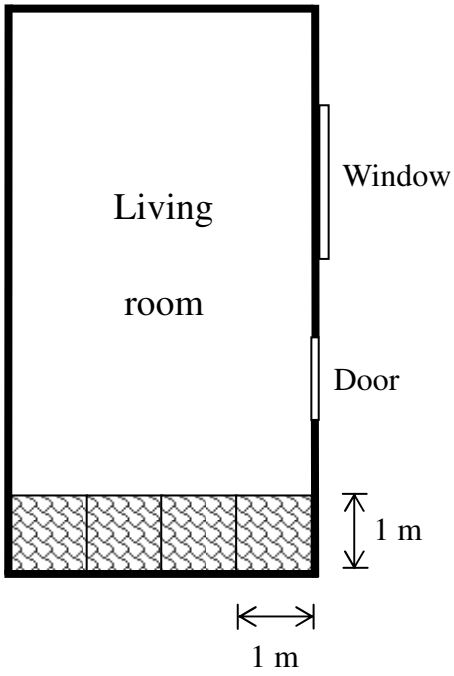
47. The cost of a mobile phone is \$300. If it is sold at a 20% discount of the marked price, and the profit is \$200. Find its marked price.

48. The following data show the numbers of library books borrowed by 20 students in the first term.

9	36	24	18	22
34	21	28	6	32
46	4	13	14	47
15	27	7	10	5

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

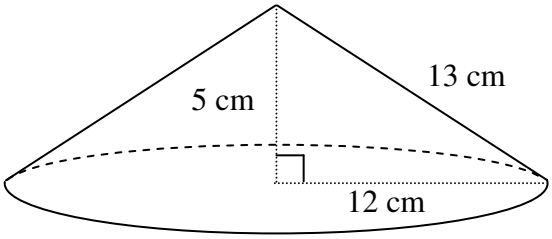
49. The figure shows the floor plan of a rectangular living room. One side of the living room is paved with 4 square floor tiles. The size of each floor tile is 1m × 1m.
Estimate the area of the living room and explain your estimation method.



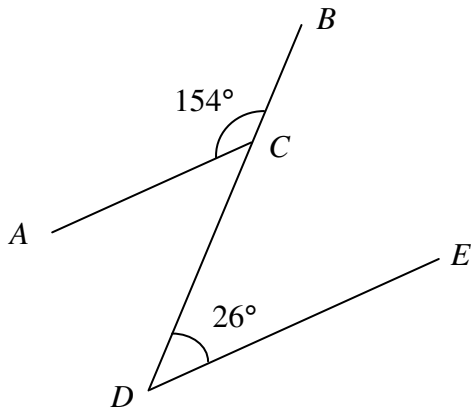
50. The figure shows a right circular cone of base radius 12 cm and height 5 cm.
Its slant height is 13 cm.

(a) Find the volume of the cone in terms of π.

(b) Find the curved surface area of the cone in terms of π.



51. In the figure, BCD is a straight line, $\angle ACB = 154°$ and $\angle CDE = 26°$. Prove that $AC // DE$.



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