9	M	E	3

Education Bureau

Territory-wide System Assessment 2008

Secondary 3

Mathematics

QUESTION BOOKLET

INSTRUCTIONS

1. There are 56 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. Rough work should be done on the rough work sheet provided.

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

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. $1.34 \times 10^5 =$

   A. 13 400
   B. 134 000
   C. 1 340 000
   D. 13 400 000

2. A rectangle is x cm long and 2 cm wide. Find its perimeter.

   A. $2x$ cm
   B. $(x + 4)$ cm
   C. $(2x + 2)$ cm
   D. $2(x + 2)$ cm

3. Which of the following is a polynomial in x?

   A. $\sqrt{x} + 1$
   B. $x^2 + 5$
   C. $\frac{1}{x} + 2$
   D. $\frac{3}{x+1}$

4. Determine whether each of the following is factorization or expansion.

(i)	$ax + ay = a(x + y)$
(ii)	$p(q - r) = pq - pr$

   A. (i) Factorization (ii) Factorization
   B. (i) Factorization (ii) Expansion
   C. (i) Expansion (ii) Factorization
   D. (i) Expansion (ii) Expansion

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5. 99 is the root of which of the following equations?

A. $\frac{x+99}{2}=50$

B. $\frac{x-99}{2}=50$

C. $\frac{x+1}{2}=50$

D. $\frac{x-1}{2}=50$

6. The total monthly income of Mr and Mrs Wong is \$40 000. The monthly income of Mr Wong is \$10 000 more than that of Mrs Wong.
Let $\$x$ and $\$y$ be the monthly incomes of Mr Wong and Mrs Wong respectively. Which of the following pairs of simultaneous equations shows the relations between x and y ?

A. $\begin{cases} y = x + 40000 \\ x = y + 10000 \end{cases}$

B. $\begin{cases} x + y = 40000 \\ x = y + 10000 \end{cases}$

C. $\begin{cases} x = y + 40000 \\ y = x + 10000 \end{cases}$

D. $\begin{cases} x + y = 40000 \\ y = x + 10000 \end{cases}$

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

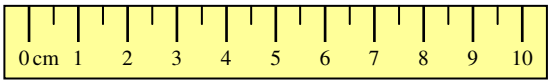
A. $2 + x > 2 + y$

B. $2 - x > 2 - y$

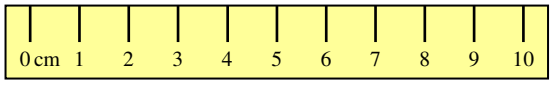
C. $2x > x + y$

D. $2x > 2y$

8.



Ruler *A*

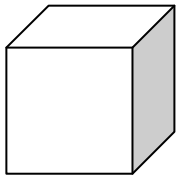


Ruler *B*

The above figure shows ruler *A* and ruler *B* with different graduations. Cindy wants to find the thickness of one sheet of paper. Among the following methods, which one is the best?

A. Cindy measures the thickness of one sheet of paper by ruler *A*.
B. Cindy measures the thickness of one sheet of paper by ruler *B*.
C. Cindy measures the thickness of 1000 sheets of paper by ruler *A* and then divides the total thickness by 1000.
D. Cindy measures the thickness of 1000 sheets of paper by ruler *B* and then divides the total thickness by 1000.

9.



4 cm

The figure above shows a cube of side 4 cm. Find its total surface area.

A. 16 cm^2
B. 48 cm^2
C. 64 cm^2
D. 96 cm^2

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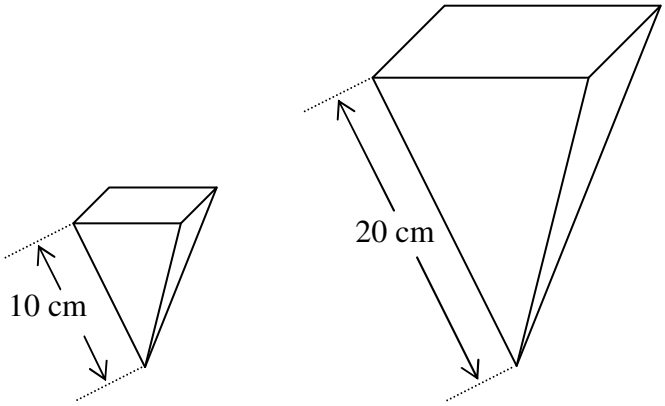
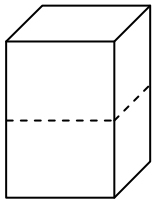
10.

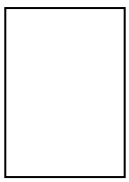


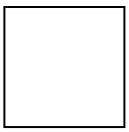
In the above figure, the lengths of corresponding slant edges of two similar pyramids are 10 cm and 20 cm respectively. If the volume of the small pyramid is V cm^3, then the volume of the large pyramid is

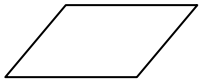
A. $2V$ cm^3 .
B. $4V$ cm^3 .
C. $6V$ cm^3 .
D. $8V$ cm^3 .

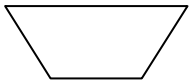
11. The figure on the right shows a prism with square base. A student sketches its cross section parallel to the base.
Which of the following sketches is correct?



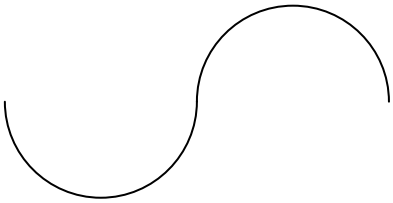
A. 

B. 

C. 

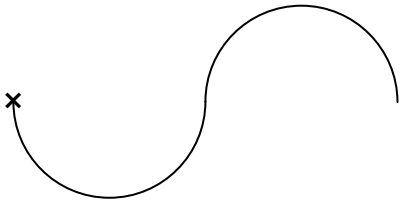
D. 

12.

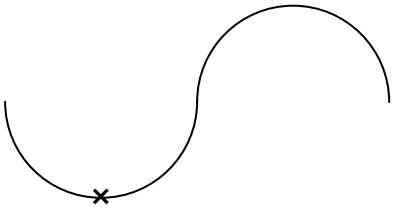


The above figure has rotational symmetry. Which "×" of the below indicates its centre of rotation?

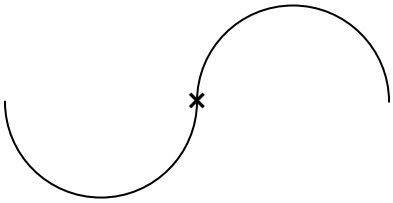
A.



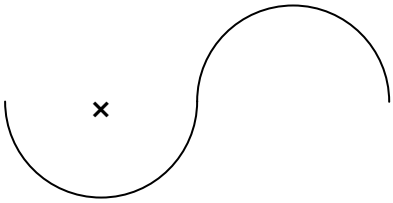
B.



C.



D.



13.

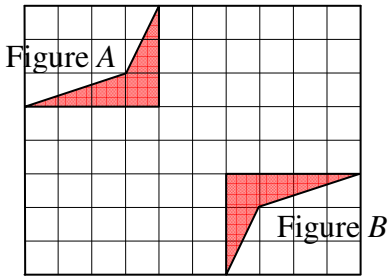


Figure *A* is changed to Figure *B* after a single transformation. The transformation is

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

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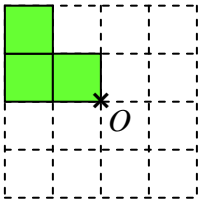
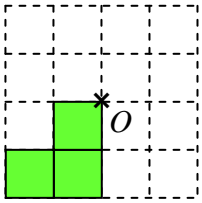
14.

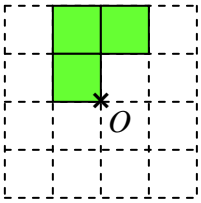


Find the image of the above shaded object after rotating about O through 90° in clockwise direction.

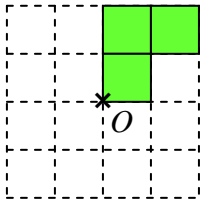
A.



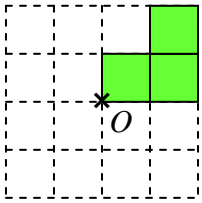
B.



C.

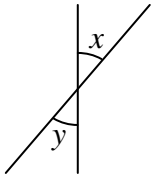


D.

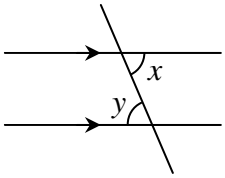


15. Which of the following figures shows that x and y are adjacent angles?

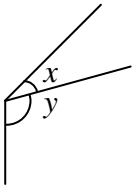
A.



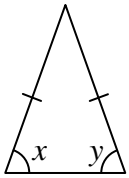
B.



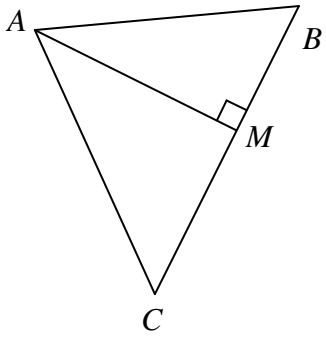
C.



D.



16.



The figure shows ΔABC where $AM \perp BC$.
AM must be

A. a median of ΔABC .
B. an altitude of ΔABC .
C. an angle bisector of ΔABC .
D. a perpendicular bisector of ΔABC .

17. 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	5	– 5	– 5	$-\frac{1}{5}$

Which of the following pairs of straight lines are perpendicular to each other?

A. L_1 and L_2

B. L_1 and L_4

C. L_2 and L_3

D. L_3 and L_4

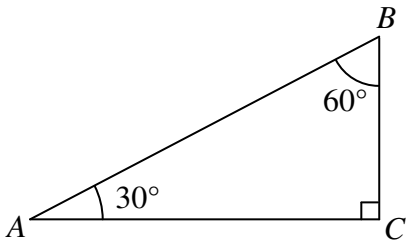
18. In the figure, a straight line AB makes an angle 30° with horizontal and an angle 60° with vertical. Find the gradient of AB.

A. sin 30°

B. sin 60°

C. tan 30°

D. tan 60°



19. An organization wants to know the daily working hours of people living in Wong Tai Sin. Which of the following is the most suitable method?

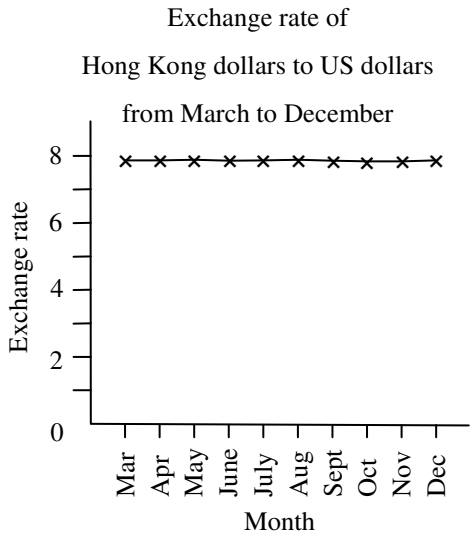
A. Use the data collected 10 years ago.

B. Interview all workers of a company in Wong Tai Sin.

C. Send questionnaires to residents living in Wong Tai Sin.

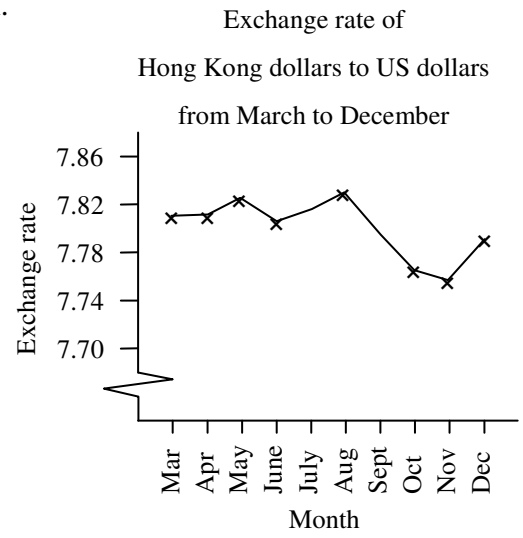
D. Estimate the number of passengers in Wong Tai Sin MTR station from 5 p.m. to 11 p.m.

20. Using the same data set (exchange rates of Hong Kong dollars to US dollars from March to December), Mr Chan drew two line graphs. One of them is shown as follows:

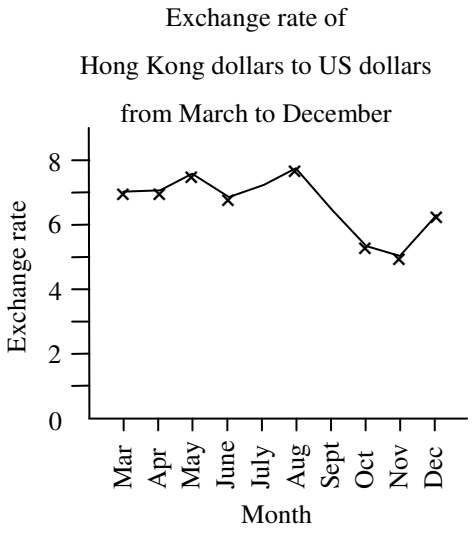


Which of the following is most likely the other line graph?

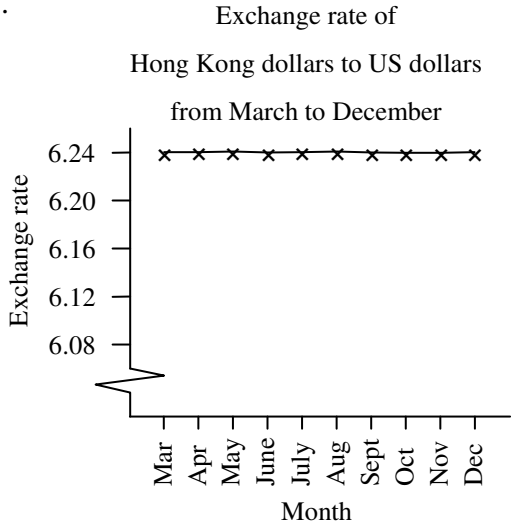
A.



B.



C.



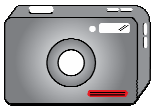
D.

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

21. Evaluate $\frac{-5+3}{4-5}$.

22. Use "×" to mark the number $-\frac{12}{7}$ on the number line given in the ANSWER BOOKLET.

23. An old model camera was sold for \$1800. The percentage loss was 10%.
Find the cost of the camera.



24. Some teachers and 200 students participated in a school picnic. The ratio of the number of teachers to the number of students was 3 : 40. Find the number of teachers.

25. Dennis wanted to buy 9 train tickets. He gave the booking clerk x fifty-dollar notes, and received \$5 in change. Find the price of each ticket in terms of x.

26. Raymond weighs x kg and Mary weighs y kg. If their total weight is three times the weight of Raymond, write an equation relating x and y .

27. Given the n^{th} term of a sequence is $n^3 + 1$. Find the first and second terms of the sequence.

28. Simplify $(m - 2m^2) + (2m - 3m^2)$.

29. Expand $(y-1)(y-2)$.

30. Factorize $ax + 2a + bx + 2b$.

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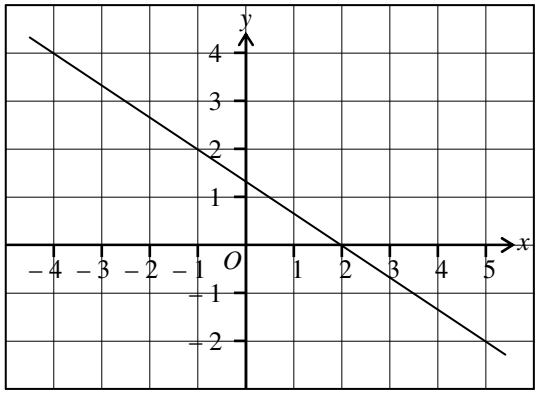
31. Solve $3-2x=5$.

32.



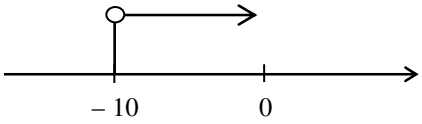
The figure above shows the graph of $2x+3y=4$. Which of the following points lie on the straight line? (There may be more than one answer.)

$$P(-3\ ,\ 3),\quad Q(-1\ ,\ 2),\quad R(0\ ,1),\quad S(4\ ,-\frac{4}{3})$$

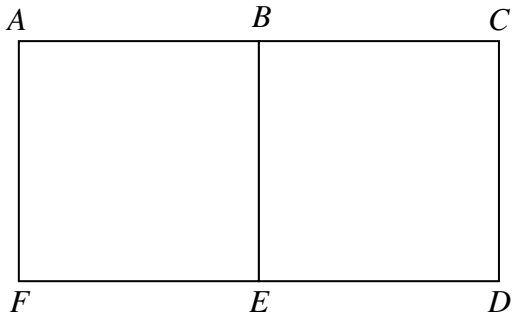
33. Expand $(2x-5y)(2x+5y)$.

34. Solve the inequality $2x-1\geq -3$.

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

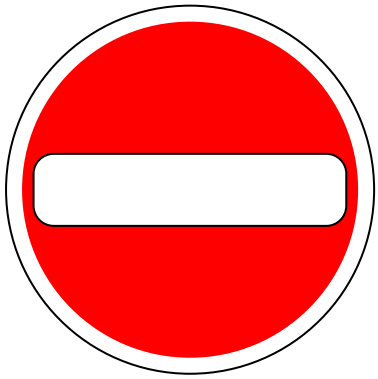


36.



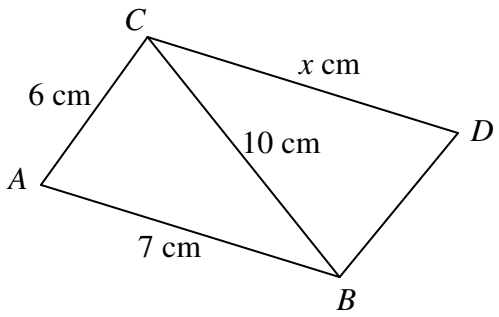
In the above figure, the rectangle $ACDF$ is divided into two squares. Name one of the squares with the letters shown.

37.

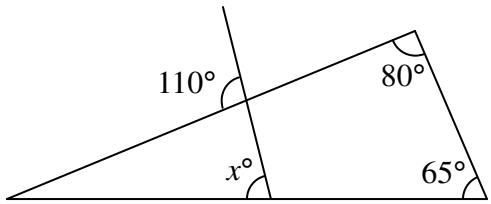


The above figure has rotational symmetry. Find the order of rotational symmetry.

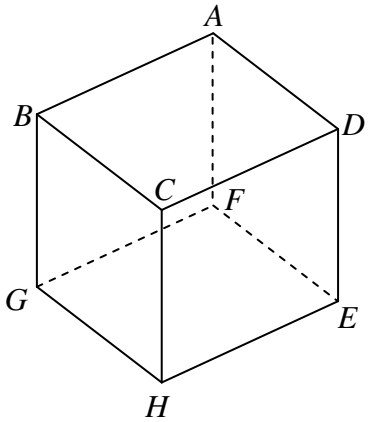
38. It is given that $\Delta ABC \cong \Delta DCB$. Find the value of x.



39. Find the value of x in the figure.



40. The figure shows a cube $ABCDEFGH$. Name the plane of reflectional symmetry containing vertices B and G.



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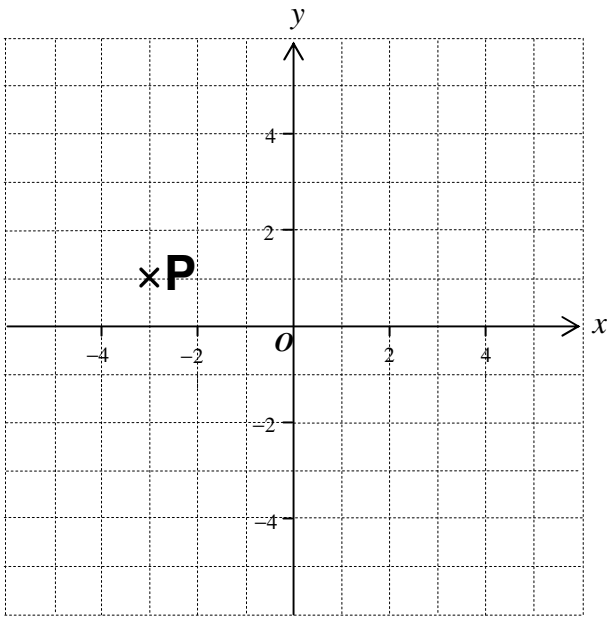
41.

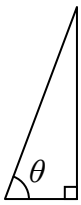


In the above rectangular coordinate plane, find the coordinates of point **P**.

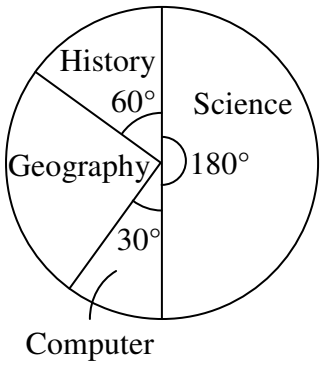
42. If $A(-2, 1)$ and $B(1, 5)$ are two points in a rectangular coordinate plane, find the distance between A and B.

43. In the figure, $\cos\theta = \frac{1}{3}$.

Find the value of θ correct to the nearest 0.1°.



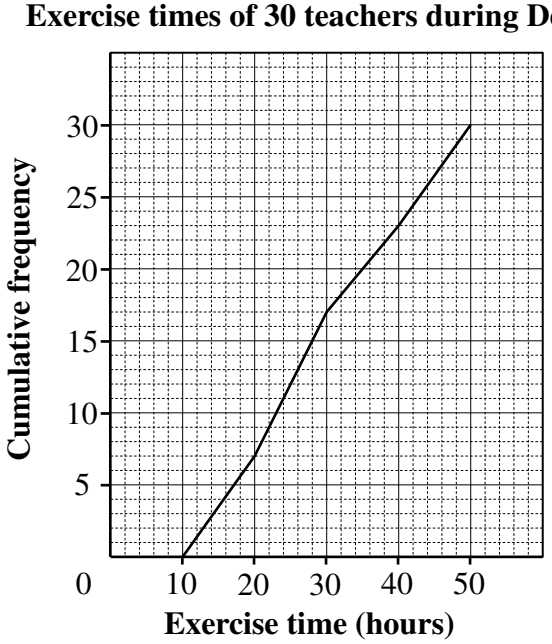
44. The following pie chart represents the individual project topics of a group of students:



(a) If 10 students chose Computer as their project topics, find the number of students choosing Science.

(b) How many students chose Geography as their project topics?

45. The exercise times of 30 teachers during December were recorded. The result is shown in the following cumulative frequency polygon:



Find the median of exercise times.

46. The following table shows the age distribution of 30 students:

Age	11 – 13	14 – 16	17 – 19
Frequency	5	10	15

Find the mean age of these students.

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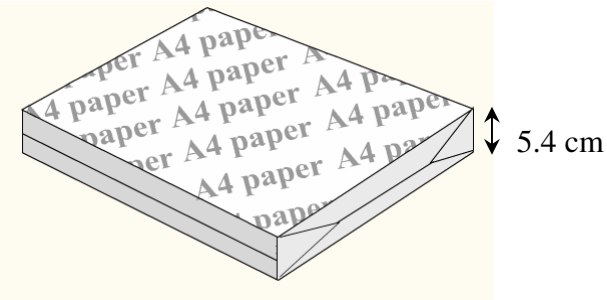
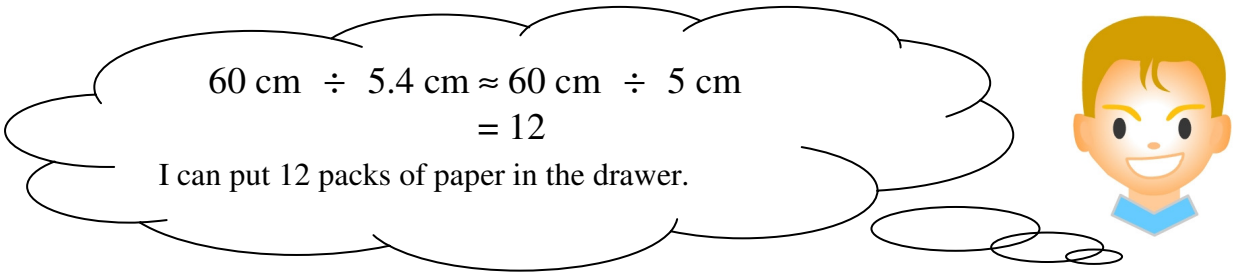
SECTION C: **All working must be clearly shown. Write the mathematical expressions, answers and statements/conclusions in the spaces provided in the ANSWER BOOKLET.**

47.



A pack of paper

The height of a pack of paper is 5.4 cm. John wants to stack up several packs of paper into a drawer of height 60 cm.



Without actual calculations, judge whether John's estimation is reasonable.
Explain why you agree or disagree with John's method of estimation.

48. Complete the following table for the equation $2y = x + 4$ in the ANSWER BOOKLET:

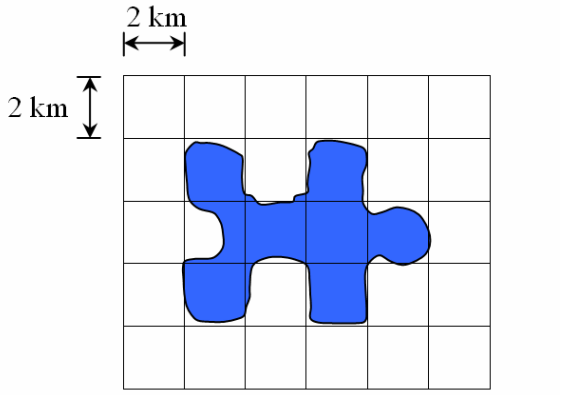
x	–4	0	4
y			4

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

49. Solve the simultaneous equations $\begin{cases} 2x + 5y = 9 \\ 3x - 4y = 2 \end{cases}$.

50. Given the formula $v^2 = u^2 + 2as$. If $v = 12$, $u = 0$ and $a = 3$, find the value of s.

51.

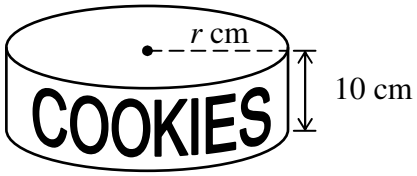


The figure above shows an island on a map.

(a) Estimate the area of the island.

(b) Explain your method of estimation.

52.



The figure above shows a cylindrical cookie can. Its height is 10 cm and volume is 1960 π cm^3. The radius of the can is r cm. Find the value of r.

53.

In the figure, the signboard of an amusement game centre is in the shape of a sector. Its radius and angle of the sector are 1.4 m and 300° respectively. Find the area of the signboard correct to 1 decimal place.

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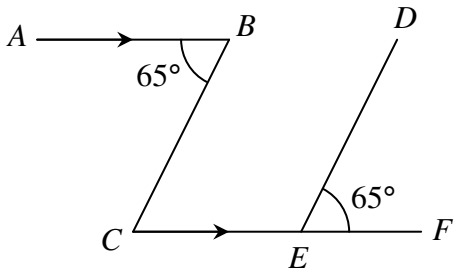
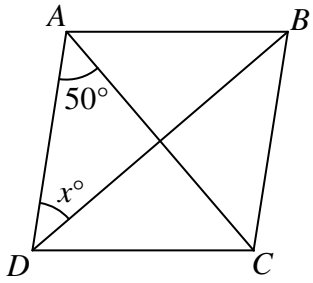
54. In the figure, $\angle ABC = \angle DEF = 65°$, CEF is a straight line and $AB \parallel CF$.
Prove that $BC \parallel DE$.



55. In the figure, $ABCD$ is a rhombus. Find the value of x.



56. The times taken in minutes for 20 students to travel from school to home are as follows:

6	26	59	8	39
39	29	7	33	50
23	29	43	35	27
12	55	53	34	58

Complete both frequency distribution tables given in the ANSWER BOOKLET.

END OF PAPER

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