9	M	E	3	(	Q	)

Education Bureau

Territory-wide System Assessment 2015

Secondary 3 Mathematics

QUESTION BOOKLET

INSTRUCTIONS

1. There are 50 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. Determine whether to estimate or to compute the exact value in each of the following situations.

(i) Total population of the World.
(ii) The number of textbooks bought by John in the new academic year.

	(i)	(ii)
A.	To compute the exact value	To compute the exact value
B.	To compute the exact value	To estimate
C.	To estimate	To compute the exact value
D.	To estimate	To estimate

2. Round off 0.079 95 to 3 decimal places.

A. 0.079 9
B. 0.08
C. 0.080
D. 0.080 0

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

(i) 3 kg of watermelon costs $42.
(ii) The heights of my brother and sister are 178 cm and 165 cm respectively.

	(i)	(ii)
A.	Rate	Rate
B.	Rate	Ratio
C.	Ratio	Rate
D.	Ratio	Ratio

4. In shop A, the price of each correction pen is \$$x$. The price of each correction pen is now decreased by \$3. Stanley buys 4 correction pens and pays \$$y$. Which of the following equations represents the relationship between x and y?

A. $y = 4x - 3$
B. $y = 4(x - 3)$
C. $y = 4x + 3$
D. $y = 4(x + 3)$

5. $(-3)^{-3} =$

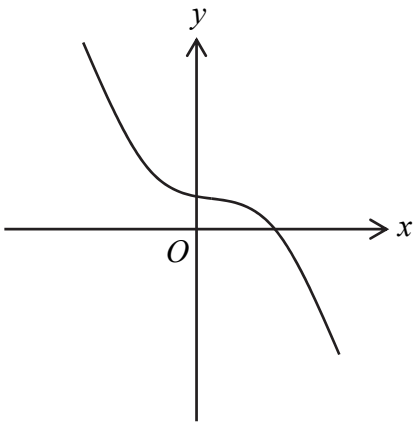
A. $27.$
B. $-27.$
C. $\frac{1}{27}.$
D. $-\frac{1}{27}.$

6. A packet of candies is shared among 5 boys. Each boy can get x candies. If the packet of candies is shared among 6 girls, the number of candies each girl gets is less than that each boy gets by 3. Which of the following equations can be used to find the value of x?

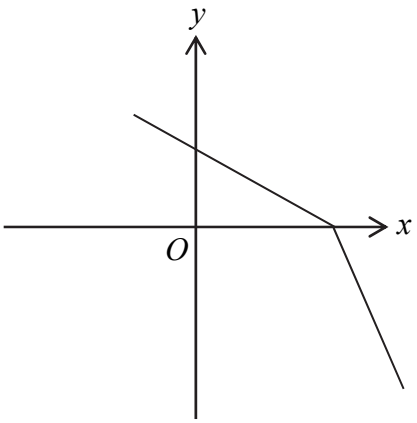
A. $5x = 6(x - 3)$
B. $5x = 6x - 3$
C. $\frac{x}{5} = \frac{x}{6} + 3$
D. $\frac{x}{5} = \frac{x+3}{6}$

7. Which of the following may represent the graph of the equation $2x + 3y - 6 = 0$?

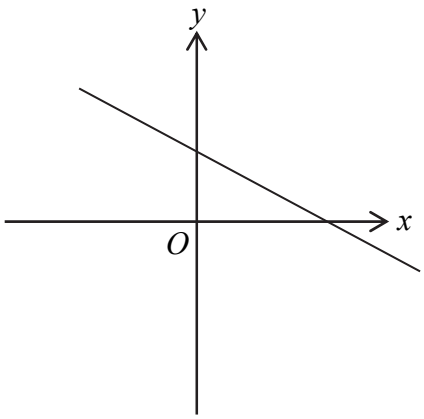
A.



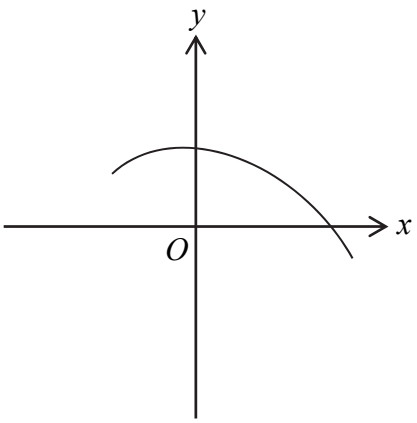
B.



C.



D.



8. If $x < y$, which of the following inequalities is correct?

A. $-2x > -2y$

B. $2x > 2y$

C. $2x > x + y$

D. $x + y > 2y$

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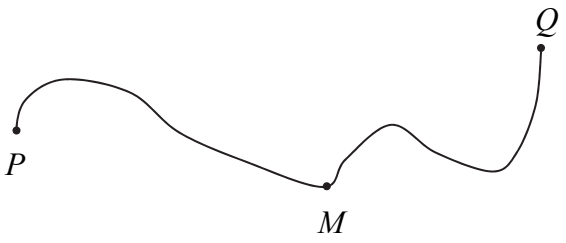
9. The temperature of a cold storage room is –25°C (correct to the nearest °C). Which of the following could be its actual temperature?

A. – 24.2 °C
B. – 24.4 °C
C. – 25.3 °C
D. – 25.6 °C

10. Susan needs to measure the length of a curved path PQ on a map. Among the following methods, which one can give a more accurate measurement of the length?

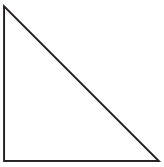


A. From point P to point Q, use a thread to place along the curved path on the map. Measure the length of the thread.
B. From point P to point Q, use a rubber band to place along the curved path on the map. Measure the length of the rubber band.
C. Use a ruler to measure the length of the line segment PQ on the map.
D. Use a ruler to measure the lengths of the line segments PM and MQ on the map, and then add up these two lengths.

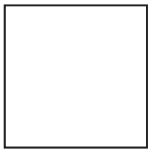
11. The ratio of the volumes of two similar cones is 1 : 27. Which of the following is the ratio of their corresponding heights?

A. 1 : 3
B. $1^2 : 3^2$
C. $1^3 : 3^3$
D. $1^3 : 27^3$

12. Which of the following is a regular polygon?

A. 

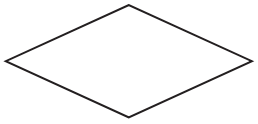
Right-angled triangle

B. 

Square

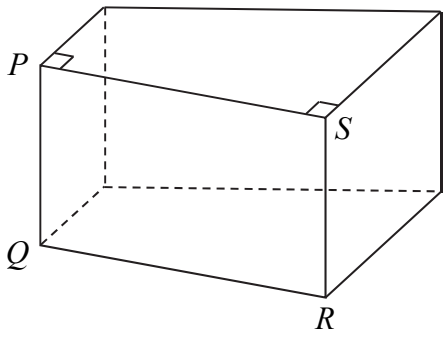
C. 

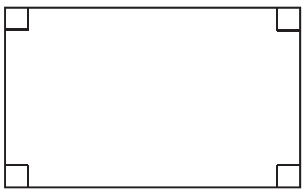
Star

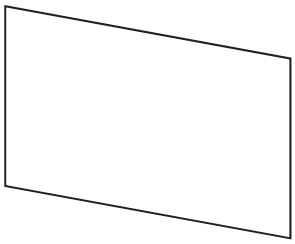
D. 

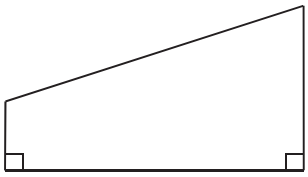
Rhombus

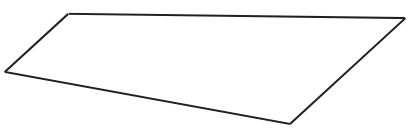
13. The figure shows a right prism. Its base is a trapezium. Alex sketches a cross-section which is parallel to the plane *PQRS*. Which of the following sketches could express the plane diagram of the cross-section?



A. 

B. 

C. 

D. 

14. Figure X is changed to Figure Y after a single transformation. What is the corresponding transformation?

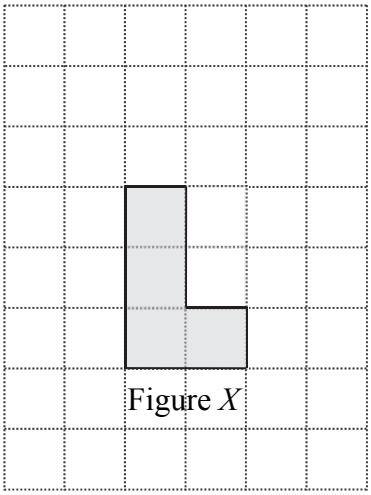


Figure X

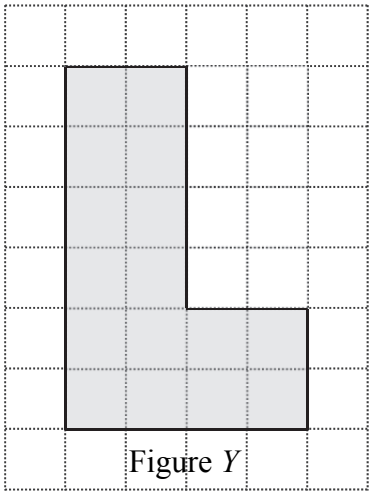
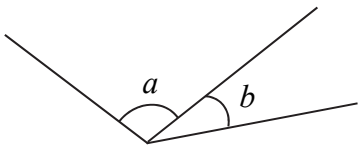


Figure Y

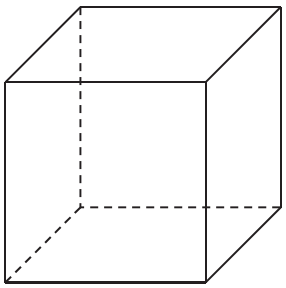
A. Reflection
B. Rotation
C. Translation
D. Enlargement

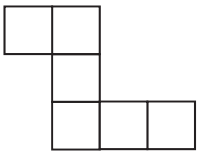
15. In the figure, a and b are

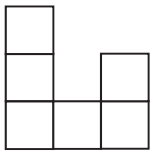


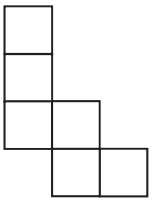
A. vertically opposite angles.
B. angles at a point.
C. interior angles on the same side.
D. adjacent angles.

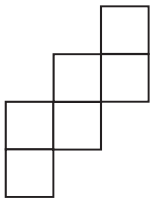
16. Which of the following nets can be folded into a cube?



A. 

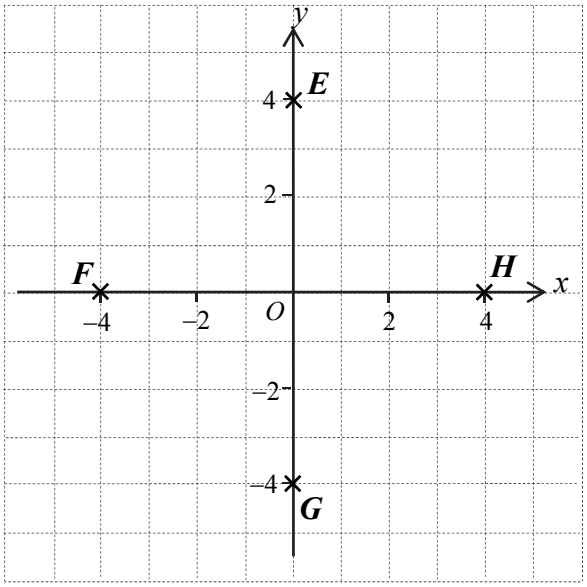
B. 

C. 

D. 

17. In the figure, which point can be represented by (–4 , 0)?

A. ***E***
B. ***F***
C. ***G***
D. ***H***



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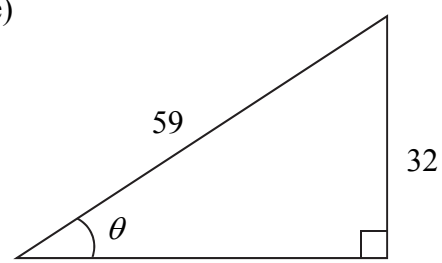
18. It is given that the slope of a straight line ℓ is $-\frac{4}{7}$. Which of the following straight lines is parallel to ℓ?

Straight line	L_1	L_2	L_3	L_4
Slope	$\frac{4}{7}$	$-\frac{4}{7}$	$\frac{7}{4}$	$-\frac{7}{4}$

A. L_4
B. L_3
C. L_2
D. L_1

19. Refer to the figure, find θ. (Correct to the nearest degree)



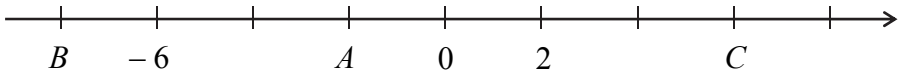
A. 28°
B. 33°
C. 57°
D. 62°

20. A supermarket supervisor wants to know the customers' opinions on the service quality of the staff. Which of the following is the most suitable method?

A. Study the past sales records of the supermarket.
B. Count the number of customers entering the supermarket every day.
C. Interview the staff randomly by phone.
D. Conduct a customer survey in the supermarket using questionnaires.

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

21. Write down the numbers represented by A, B and C on the number line below.



22. There are 12 teachers and a number of students from a school going to Macau for an exchange tour. The ratio of the number of teachers to the number of students is 4 : 35. Find the number of students.

23. Find the values of x and y in the following arithmetic sequence.

$$-35\ ,\ -20\ ,\ -5\ ,\ x\ ,\ y\ ,\ \ldots$$

24. Simplify $(5x^2 + 3x) - (7x^2 - 6x)$.

25. Expand $x(4x + xy - y)$.

26. Round off $4.086\,53$ to 3 significant figures.

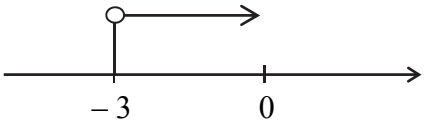
27. Factorize $x^2 + 5x - 6$.

28. Solve $2(3x - 4) + 5(2 - x) = 9$.

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

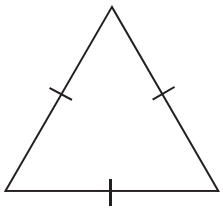
30. Make P the subject of the formula $N = \frac{P}{4} + 1$.

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

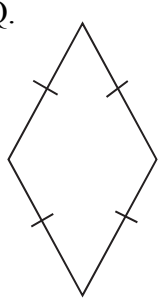


32. Which of the following polygons **MUST** be equiangular? (May be more than one answer)

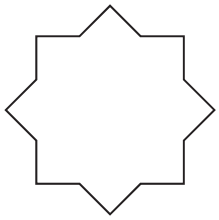
P.



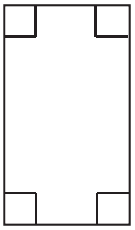
Q.



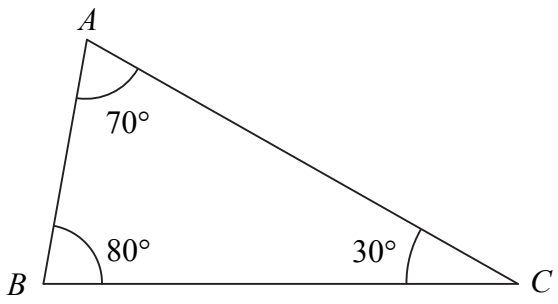
R.

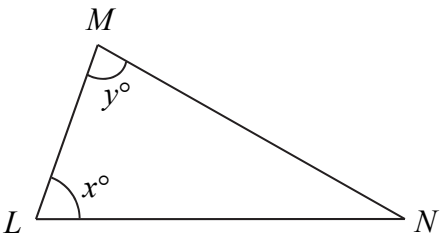


S.



33.



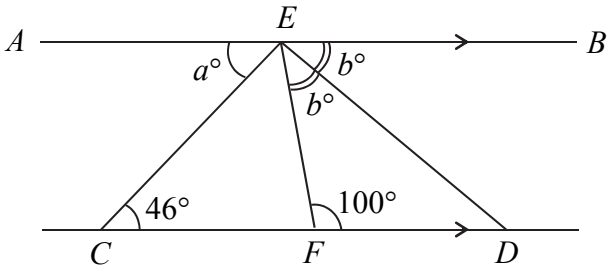


In the figure, $\triangle ABC \sim \triangle LMN$. Find

(a) the value of x,

(b) the value of y.

34. In the figure, *AEB* and *CFD* are straight lines. *AB* // *CD* and *ED* is an angle bisector of $\angle BEF$. $\angle ECF = 46°$ and $\angle EFD = 100°$. Find the values of *a* and *b*.



35. Figure 1 shows a rhombus *ABCD*. *AC* and *BD* are diagonals and intersect at *E*. Rhombus *ABCD* is folded along *AC* as shown in Figure 2. Find the angle between the plane *ACD* and the plane *ABC*.

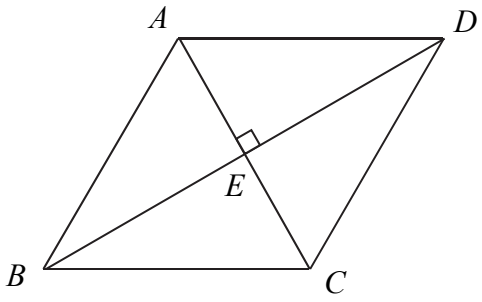


Figure 1

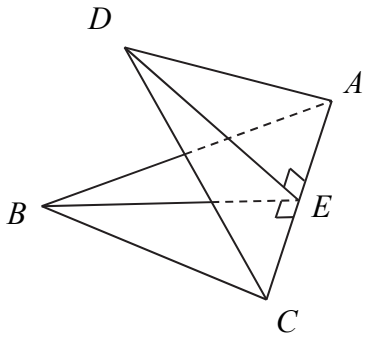
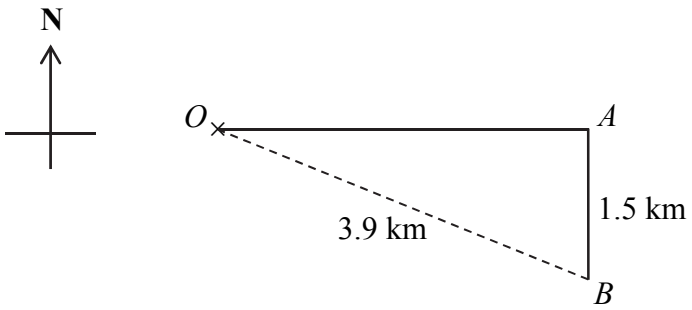
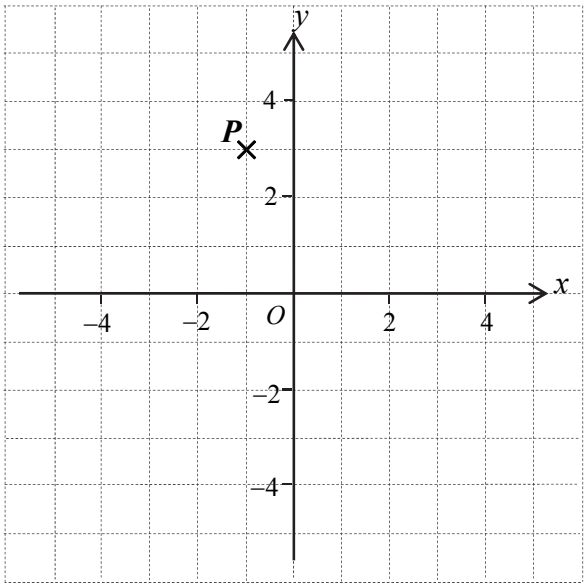


Figure 2

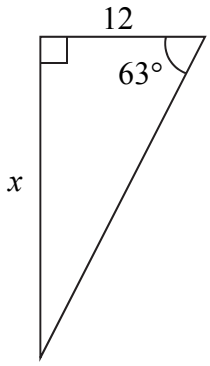
36. Cindy starts running due east from *O* to *A*. Then, she runs due south for 1.5 km to *B*. If *B* is 3.9 km away from *O*, find the distance between *O* and *A*.



37. Find the coordinates of point ***P*** in the figure.



38. Find the value of x in the figure. (Correct to 3 significant figures)

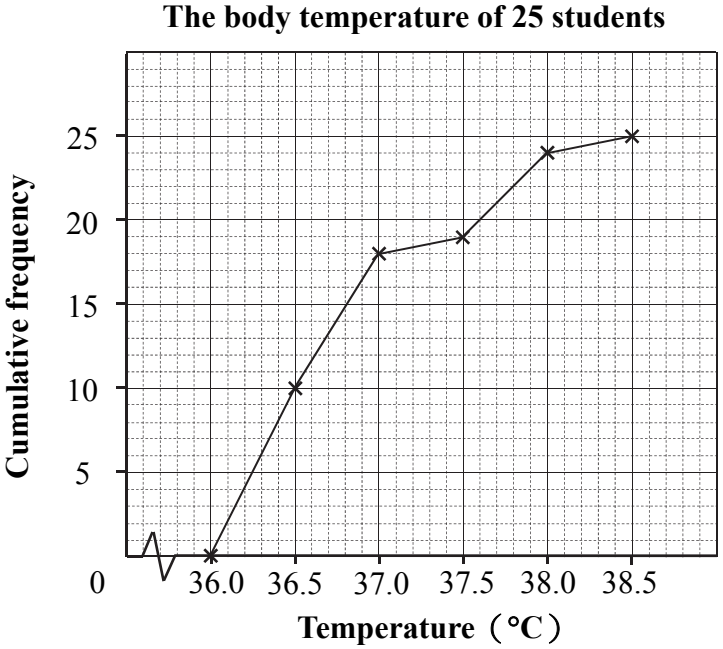


39. Miss Chow is doing a survey to analyse information about the careers of last year's graduates. The survey is conducted in the following four stages.

(1) Giving career questionnaires to last year's graduates.
(2) Analysing bar charts and data to draw conclusions.
(3) Using bar charts to represent the data.
(4) Collecting questionnaires and organising the data obtained.

Arrange these stages in the correct order. For example: (1) → (2) → (3) → (4)

40. The cumulative frequency polygon below shows the body temperature of 25 students.



How many students have a body temperature of 37.5°C or above?

41. The table below shows the travelling distances of 50 taxis last Friday.

Travelling distances (km)	321 – 340	341 – 360	361 – 380	381 – 400	401 – 420
Frequency	4	7	11	22	6

From the above information, find the modal class of the travelling distances.

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

42. The marked price of a pair of sports shoes is \$840. They are now sold at a discount of 20%. Find the selling price of the pair of sports shoes.

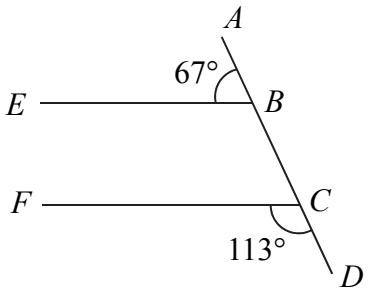
43. Michael bought a smartphone for \$4 400 two years ago. Its value has decreased by 35% each year. Find the present value of the smartphone.

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

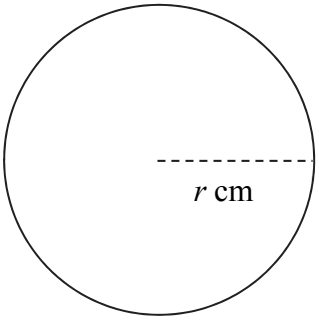
x	-2	1	2
y		1	

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

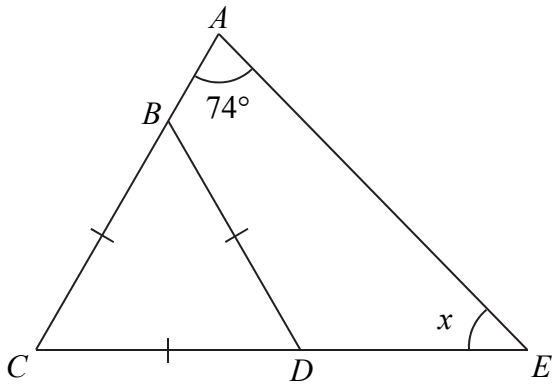
45. In the figure, $ABCD$ is a straight line. $\angle ABE = 67°$ and $\angle FCD = 113°$. Prove that $BE // CF$.



46. In the figure, the radius of the circle is r cm. Its circumference is 34π cm.
    (a) Find the value of r.
    (b) Find the area of the circle. Express the answer in terms of π.



47. In the figure, $\triangle BCD$ is an equilateral triangle. ABC and CDE are straight lines, $\angle CAE = 74°$. Find x.



48. Jacky wants to use a lorry to carry some machines weighing 58.8 kg each. The maximum loading of the lorry is 1800 kg. Give **an appropriate approximation** for the weight of each machine. Hence, estimate the maximum number of machines that can be carried by the lorry each time.
    Remarks: Consider the weight of the machine and the maximum loading of the lorry only.

49. The following data show the marks that 15 students obtained in a dictation (full mark is 50).

24	50	15
45	42	50
18	37	38
48	29	48
12	11	24

According to the above data, complete the stem-and-leaf diagram in the **ANSWER BOOKLET**.

50. Consider a family with 3 children.
    (a) Let B represent a boy and G represent a girl. Complete the tree diagram provided in the **ANSWER BOOKLET** to list out all possible outcomes.
    (b) Find the probability that only one child is a girl in the family.

END OF PAPER

Do not write on this page.

Answers written on this page will not be marked.