

9	M	E	1	(Q)
----------	----------	----------	----------	----------	----------	----------

Education Bureau
Territory-wide System Assessment 2009
Secondary 3
Mathematics
QUESTION BOOKLET

INSTRUCTIONS

1. There are 49 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.
6. 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	$= 2\pi r h$
	Volume	$= \pi r^2 h$
Cone	Curved surface area	$= \pi r l$
	Volume	$= \frac{1}{3}\pi r^2 h$
Prism	Volume	$= \text{base area} \times \text{height}$
Pyramid	Volume	$= \frac{1}{3} \times \text{base area} \times \text{height}$

SECTION A: Choose the best answer for each question.

You should mark all your answers in the ANSWER BOOKLET.

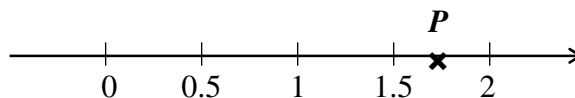
1. There were 26 students in a class. During today's Home Economic lesson, each student brought one to three eggs. Which of the following numbers **CANNOT** be the total number of eggs brought by the class of students?

- A. 16
- B. 26
- C. 55
- D. 75

2. Round off 0.001 849 to 3 decimal places.

- A. 0.00
- B. 0.001
- C. 0.002
- D. 0.00185

3. Which of the following numbers is closest to the value represented by ***P*** on the number line?



- A. 1.5
- B. $\sqrt{2}$
- C. $\sqrt{3}$
- D. 2

4. Jade saved \$1880 of Red Pocket money during Chinese New Year. After the holiday, she spent \$120 of her Red Pocket money each week. Which of the following formulas expresses the remaining amount of Jade's Red Pocket money n weeks after the holiday?

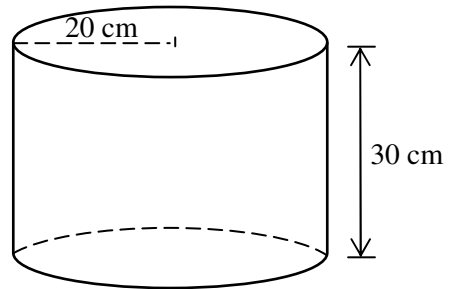
- A. $n - 120$
- B. $1880 - 120n$
- C. $1220n - 1880$
- D. $1880 + n - 120$

5. Which of the following polynomials has two like terms?
- A. $3x - 3y$
 - B. $3x - 5x$
 - C. $5x + 3x^2$
 - D. $7x + 7xy$
6. Simplify $\frac{4x^{-3}}{8x^2}$.
- A. $2x^6$
 - B. $2x^5$
 - C. $\frac{1}{2x^5}$
 - D. $\frac{1}{2x^{-5}}$
7. Given that the equation of straight line L is $x - 2y + 2 = 0$, which of the following points lies on L ?
- A. $(2, 1)$
 - B. $(-2, 1)$
 - C. $(198, 100)$
 - D. $(-198, 100)$
8. If $x < y$, which of the following inequalities is **INCORRECT**?
- A. $\frac{x}{-2} < \frac{y}{-2}$
 - B. $\frac{x}{2} < \frac{y}{2}$
 - C. $2x < 2y$
 - D. $x - 2 < y - 2$

9. To sterilize classrooms, 100 mL of bleach is mixed with 10 L of water. Choose the appropriate containers to measure the volumes of bleach and water:
- Use a bucket to measure 100 mL of bleach and 10 L of water.
 - Use a bucket to measure 100 mL of bleach, and a measuring cup to measure 10 L of water.
 - Use a measuring cup to measure 100 mL of bleach, and a bucket to measure 10 L of water.
 - Use a measuring cup to measure 100 mL of bleach and 10 L of water.

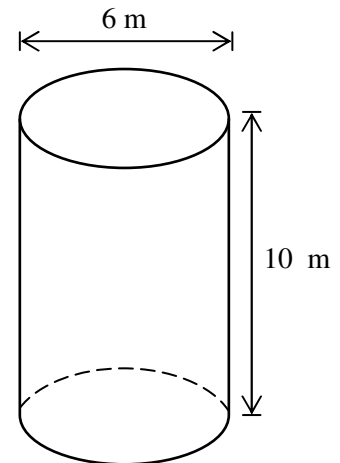
10. The base radius of a solid cylinder is 20 cm. Its height is 30 cm. Find the total surface area of the cylinder in terms of π .

- $1200\pi \text{ cm}^2$
- $1600\pi \text{ cm}^2$
- $2000\pi \text{ cm}^2$
- $12000\pi \text{ cm}^2$



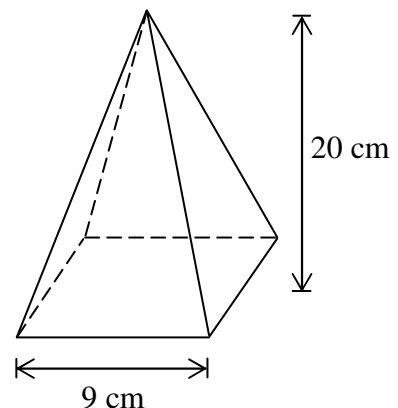
11. The Pure Water Company bought a new water tank. The tank is a cylinder with diameter 6 m and height 10 m. Find the volume of the water tank in terms of π .

- $60\pi \text{ m}^3$
- $90\pi \text{ m}^3$
- $120\pi \text{ m}^3$
- $360\pi \text{ m}^3$



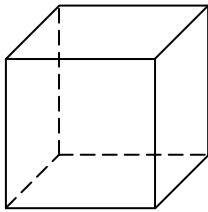
12. The height of the pyramid in the figure is 20 cm. It has a square base with side length 9 cm. The volume of the pyramid is

- 180 cm^3 .
- 540 cm^3 .
- 720 cm^3 .
- 1620 cm^3 .

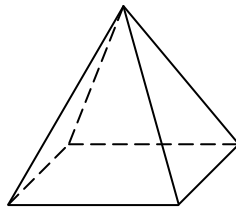


13. The following are diagrams of four 3-D figures. Which of these **CANNOT** be a regular polyhedron?

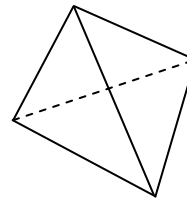
A.



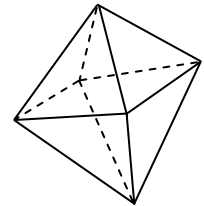
B.



C.

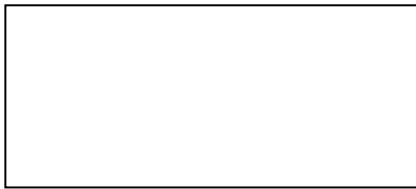


D.

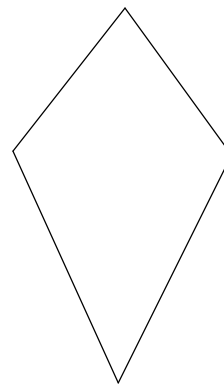


14. Choose the figure which has exactly two axes of symmetry.

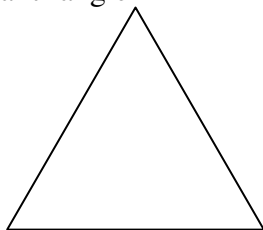
A. Rectangle



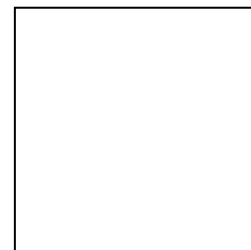
B. Kite



C. Equilateral triangle

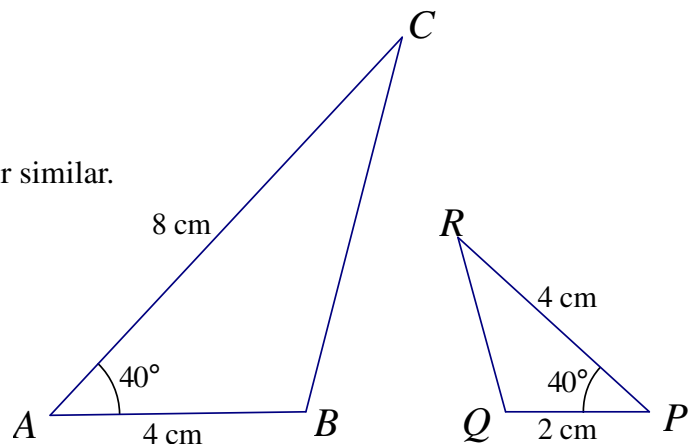


D. Square

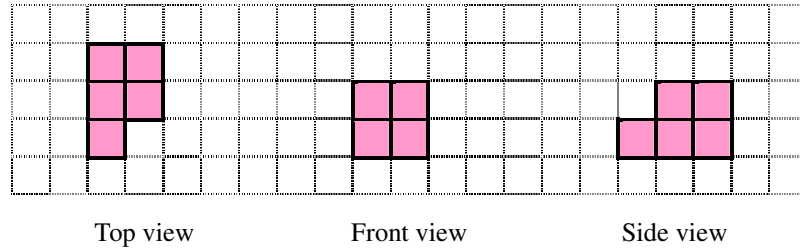


15. According to the figures, which of the following is correct?

- A. $\triangle ABC \cong \triangle PQR$ (SAS)
- B. $\triangle ABC \sim \triangle PQR$ (3 sides proportional)
- C. $\triangle ABC \sim \triangle PQR$ (ratio of 2 sides, inc \angle)
- D. $\triangle ABC$ and $\triangle PQR$ are neither congruent nor similar.

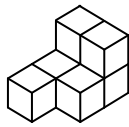


16. The figures show the 2-D representations of a solid from various views:



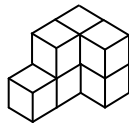
Which of the following could be the solid?

A.



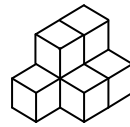
Front

B.



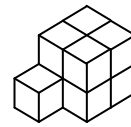
Front

C.



Front

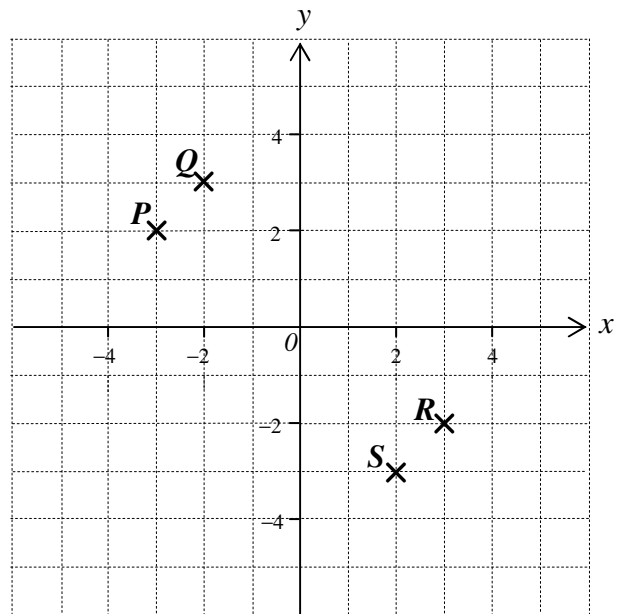
D.



Front

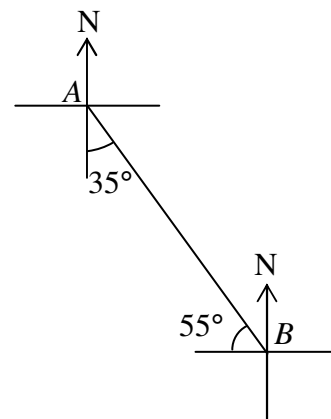
17. In the figure, which point has coordinates $(2, -3)$?

- A. *P*
- B. *Q*
- C. *R*
- D. *S*

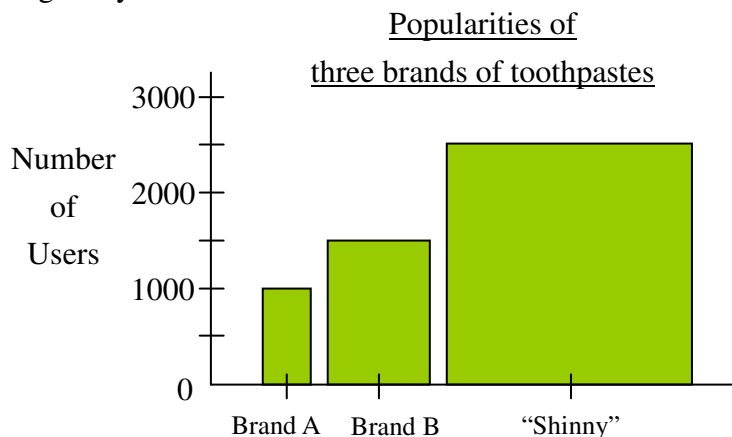


18. Find the compass bearing of *A* from *B*.

- A. $N35^\circ W$
- B. $S35^\circ E$
- C. $N55^\circ W$
- D. $S55^\circ E$



19. Which of the following is continuous data?
- The number of each kind of cookies in 10 boxes of cookies
 - The lengths of 25 telephone ropes
 - The sizes of 20 pairs of running shoes
 - The marks of a Chinese quiz of 20 students
20. The following is an advertisement comparing the popularities of “Shinny” Toothpaste and other brands in a marketing study:



The above diagram is misleading because

- The number of people interviewed in the market study is not enough.
 - The mark of “Shinny” is not placed on the leftmost side of horizontal axis.
 - The scale of vertical axis is not consistent.
 - The bars do not have the same width.
21. The following table lists the number of days of fencing practice of Susan and her teammates last month:

Fencing team member	Number of days of practice
Susan	14
Karen	10
Yuki	14
Mandy	12

Find the arithmetic mean and median of this set of data.

- Arithmetic mean = 12.5 days; median = 12 days.
- Arithmetic mean = 12.5 days; median = 13 days.
- Arithmetic mean = 14 days; median = 12 days.
- Arithmetic mean = 14 days; median = 13 days.

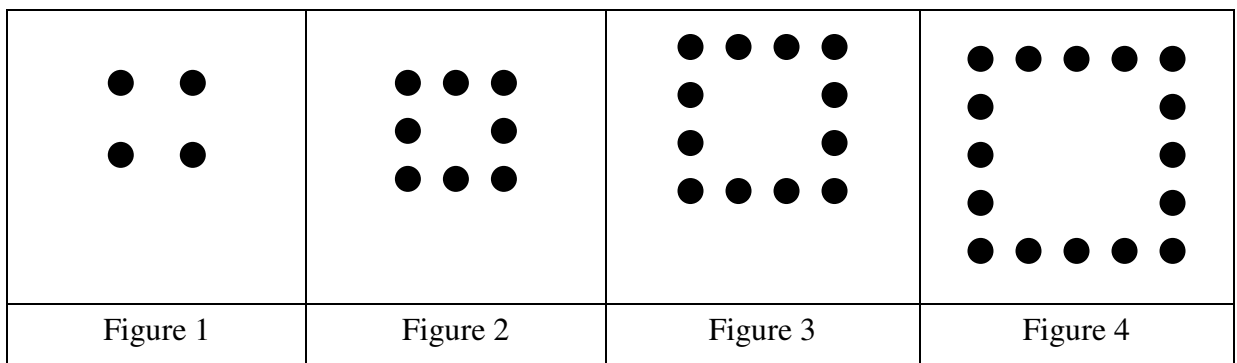
**SECTION B: Write ALL the answers in the ANSWER BOOKLET.
Working need not be shown.**

22. The manager of a football team used positive and negative numbers to represent goals scored and goals lost. Use suitable numbers to represent the following goals scored and goals lost:
- (i) 4 goals scored
 - (ii) 5 goals lost

23. Calculate $\frac{4 + 7(-6)}{-2}$.

24. Determine whether a rate or a ratio should be used to relate the quantities in each of the following statements.
- (i) The area of A3 paper and that of A4 paper are 1247.4 cm^2 and 623.7 cm^2 respectively.
 - (ii) The weight of 10 000 pieces of A4 paper is 56.133 kg.

25. Ken used dots to form the following figures:

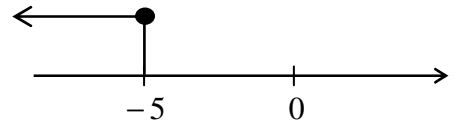


According to the patterns, how many dots form Figure n ?

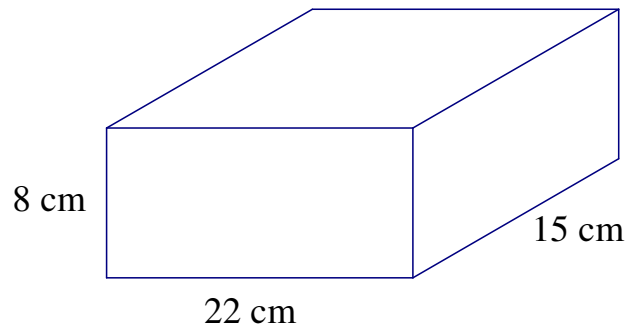
26. Expand $(4x + 3)(x + 1)$.
27. Factorize $x^2 - 2x - 15$.
28. Draw the graph of $2y = x + 1$ on the rectangular coordinate plane given in the ANSWER BOOKLET.

29. It is given the formula $z^3 = \frac{(2x)^2}{y}$. If $z = 2$, $x = -3$, find the value of y .

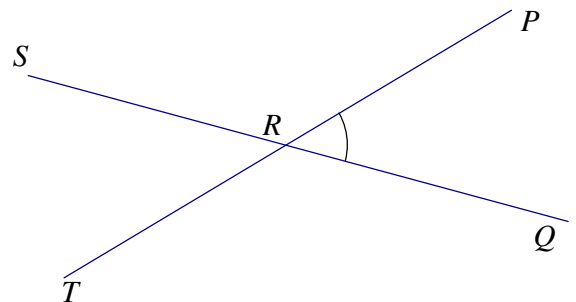
30. According to the diagram, write down an inequality in x .



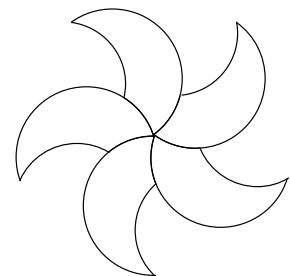
31. The length, width and height of a cuboid are 22 cm, 15 cm and 8 cm respectively. Find the total surface area of the cuboid.



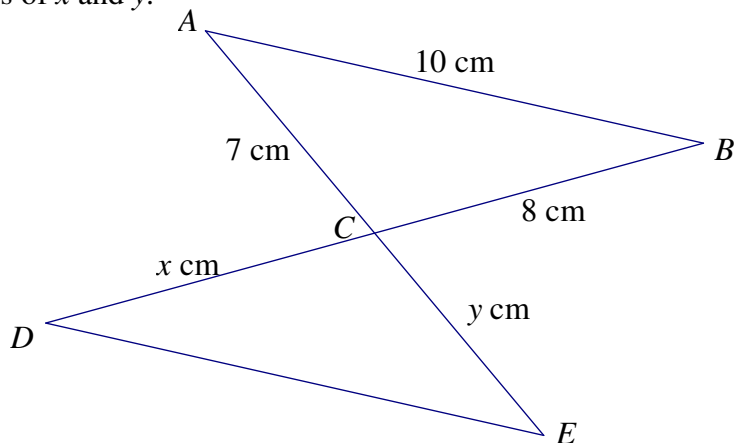
32. Use suitable notations and letters to represent the angle marked in the figure.



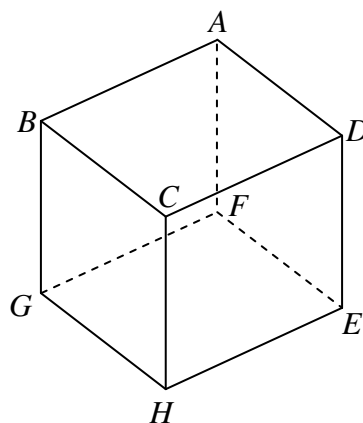
33. Find the order of rotational symmetry of the figure on the right.



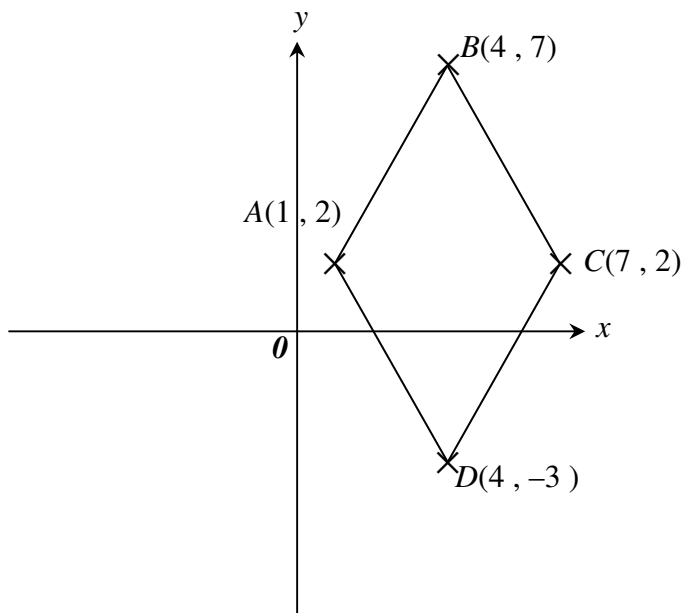
34. In the figure, $\triangle ABC \cong \triangle EDC$. Find the values of x and y .



35. The figure shows a cube $ABCDEFGH$. Using its vertices (i.e. A, B, C, D, E, F, G or H), name **ONE** of the axes of rotational symmetry of the cube.

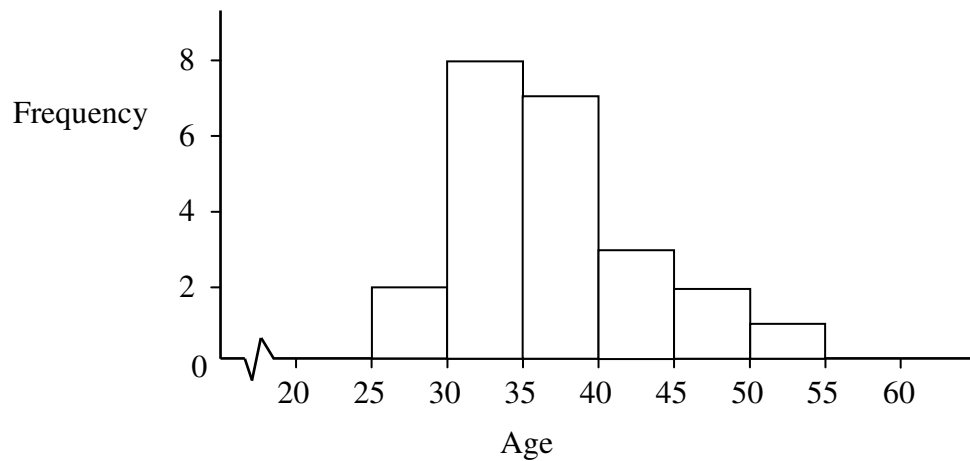


36. Find the area of quadrilateral $ABCD$ in the rectangular coordinate plane.



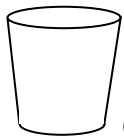
37. $A(-5, -3)$ and $B(-1, 1)$ are two points in the rectangular coordinate plane. Find the coordinates of the midpoint of line segment AB .

38. The following is the histogram of the age of all staff members of an accounting firm:

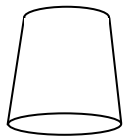


- (a) How many staff members of this accounting firm have age between 35 and 40?
- (b) How many staff members of this accounting firm have age above 45?
- (c) How many staff members are there in this accounting firm?

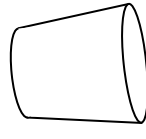
39. When a paper cup is tossed on the table, the result can only be one of the following:



(opening up),



(opening down), or



(opening sideways).

The results of tossing the paper cup 200 times are as follows:

Result	opening up	opening down	opening sideways
Frequency	12	28	160

Find the empirical probability of getting “opening sideways”.

SECTION C: All working must be clearly shown.

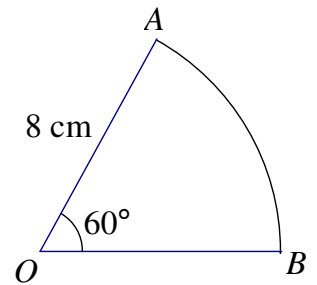
Write the mathematical expressions, answers and statements/conclusions in the spaces provided in the ANSWER BOOKLET.

40. The Student Council used 15% of school grant to buy a Table-tennis table. The table costs \$1200. Find the amount of school grant.

41. Ben deposited \$4000 into a bank. The interest rate was 3% p.a., compounded yearly. Find the amount that Ben would receive after 3 years, correct to the nearest dollars.

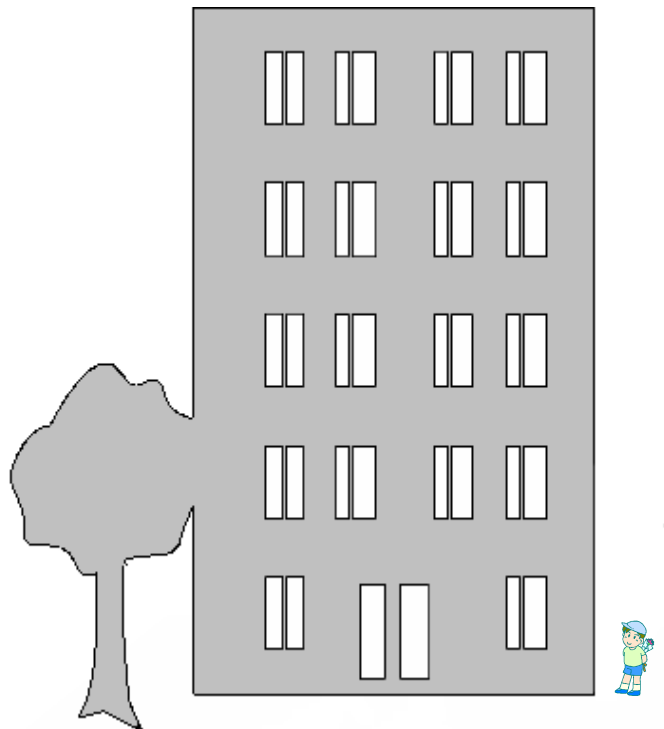
42. Simplify $\frac{x^5}{x^3y^{-4}}$ and express the answer with positive indices.

43. In the figure, the radius OA of sector OAB is 8 cm, and $\angle AOB = 60^\circ$. Find the area of the sector correct to the nearest 0.1 cm^2 .

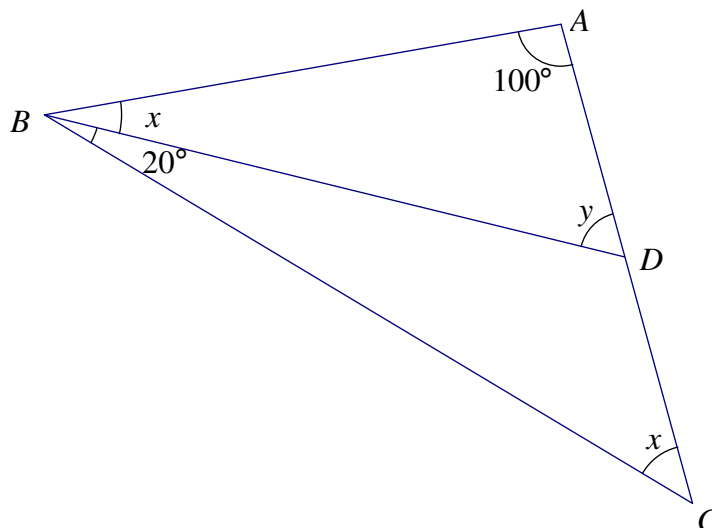


44. In the figure, the height of the boy is 1.6 m.

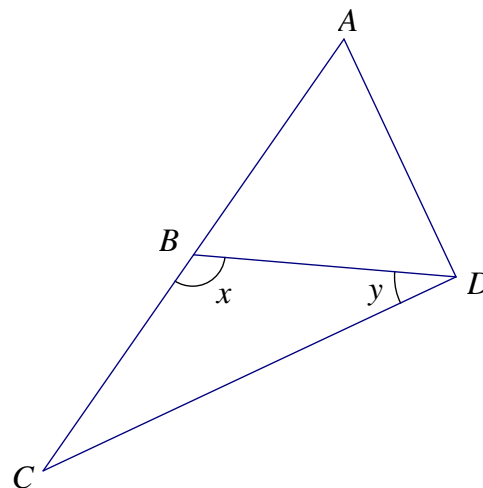
- (a) Estimate the height of the building.
- (b) Explain briefly your estimation method.



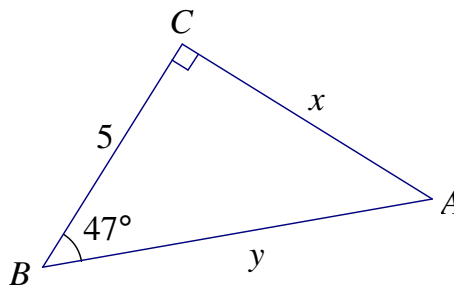
45. In the figure, ADC is a straight line.
Find x and y .



46. In the figure, ABC is a straight line, $AB = BC = BD = AD$.
Find x and y .

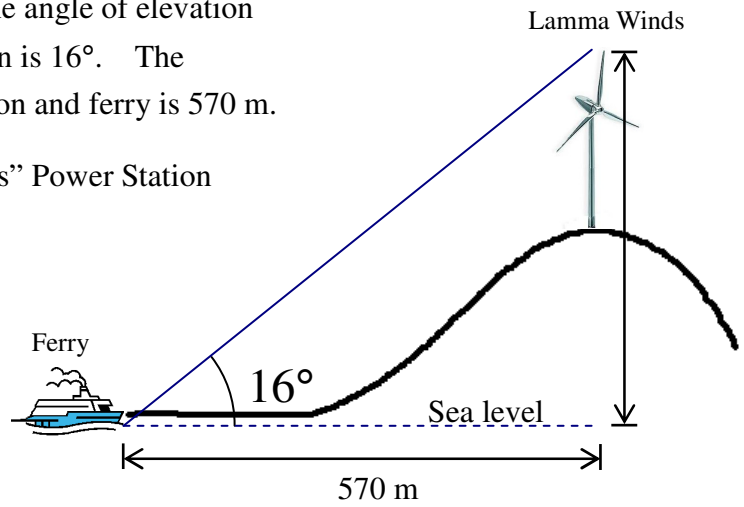


47. In the figure, $AC \perp BC$, $BC = 5$, $\angle ABC = 47^\circ$.
Find the values of x and y correct to 2 decimal places.



48. When the ferry arrives at the Lamma Island, the “Lamma Winds” Power Station on the hills can be seen. The angle of elevation from the ferry to the top of the power station is 16° . The horizontal distance between the power station and ferry is 570 m.

Find the height of the top of “Lamma Winds” Power Station from the sea level, correct to the nearest m.



49. An organization is studying the weights of students’ school bags. The weights (in kg) of school bags of 20 students are as follows:

1.6	4.8	7.2	11.0	9.0
2.4	2.2	6.1	9.0	9.7
11.5	10.6	1.9	1.9	2.3
2.3	7.2	9.5	5.5	5.1

Complete the two frequency distribution tables in the **ANSWER BOOKLET**.

END OF PAPER

