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Education Bureau
Territory-wide System Assessment 2017
Secondary 3 Mathematics
QUESTION BOOKLET

INSTRUCTIONS

1. There are 47 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	$= 2\pi r h$
	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. Determine whether to estimate or to compute the exact value in each of the following situations.

- (i) A reporter recorded the total weight of rubbish produced in Hong Kong last Friday.
- (ii) The school office recorded the number of students absent from school last Friday.

	(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. $3.59 \times 10^4 =$

- A. 35 900.
- B. 3 590 000.
- C. 0.035 9.
- D. 0.000 359.

3. $x + x + y + y =$

- A. x^2y^2 .
- B. $x^2 + y^2$.
- C. $2x + 2y$.
- D. $4xy$.

4. Which of the following is **NOT** a polynomial?

A. $w^2 + w + 3$

B. $w^2 + 3w$

C. $w^2 + \frac{w}{3}$

D. $w^2 + \frac{3}{w}$

5. Simplify $\frac{x^{-3}}{x^{-5}}$.

A. x^{-8}

B. x^8

C. x^2

D. x^{-2}

6. Betty has \$ M . After buying 4 bottles of milk, she has \$37.2 left. If the price of each bottle is \$10.7, which of the following equations can be used to find the value of M ?

A. $M - 4 \times 37.2 = 10.7$

B. $4 \times 37.2 - M = 10.7$

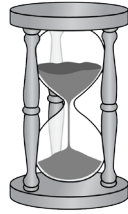
C. $M - 4 \times 10.7 = 37.2$

D. $4 \times 10.7 - M = 37.2$

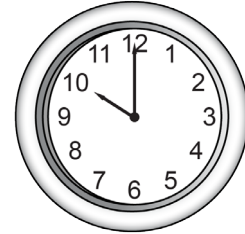
7. Which of the following is an equation with the root $\frac{1}{2}$?
- A. $2x + 1 = 0$
 - B. $2x - 1 = 0$
 - C. $x - 2 = 0$
 - D. $x + 2 = 0$
8. In 3 Mathematics tests, Mary gets 76, 62 and x marks. The average mark of these 3 tests is greater than 70. Which of the following inequalities can be used to find the range of values of x ?
- A. $\frac{76+62+x}{3} \geq 70$
 - B. $\frac{76+62+x}{3} > 70$
 - C. $\frac{76+62+x}{3} \leq 70$
 - D. $\frac{76+62+x}{3} < 70$
9. The capacity of a vase is 830 mL (correct to the nearest mL). Which of the following could be its actual capacity?
- A. 829.4 mL
 - B. 830.4 mL
 - C. 830.5 mL
 - D. 831.0 mL

10. During Sports Day, Eric needs to record the time taken by athletes to complete the 100 m running race. Which of the following tools can reduce errors the most in measurement?

A. Hourglass



B. Clock



C. Alarm clock

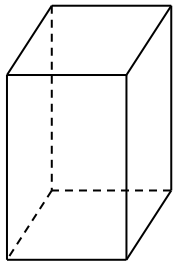


D. Stopwatch

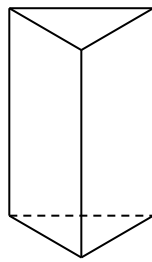


11. Which of the following figures can represent a cuboid?

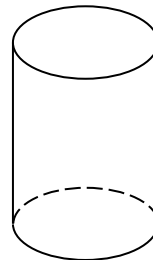
A.



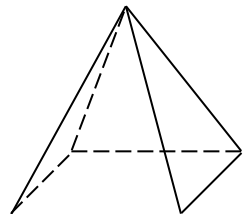
B.



C.

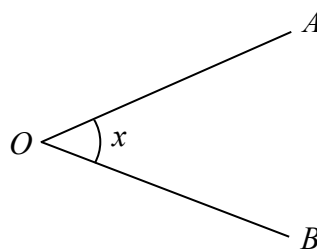


D.

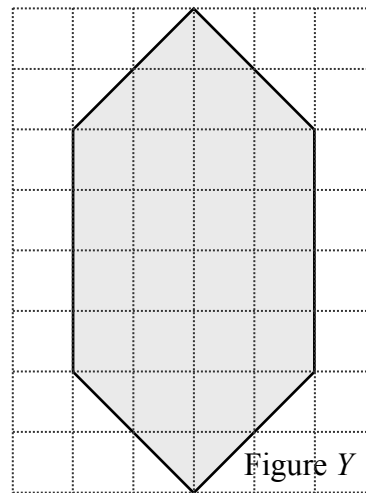
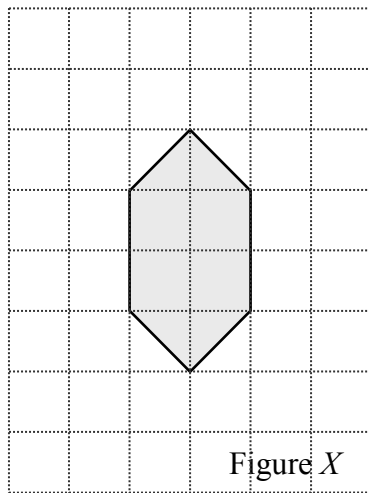


12. In the figure, x is

- A. a reflex angle.
- B. an obtuse angle.
- C. an acute angle.
- D. a straight angle.

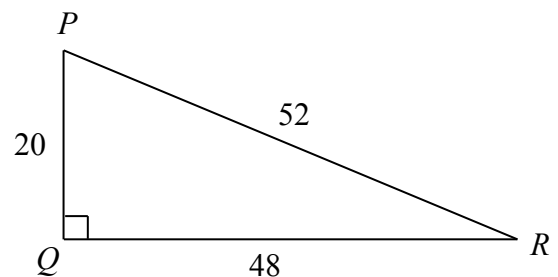
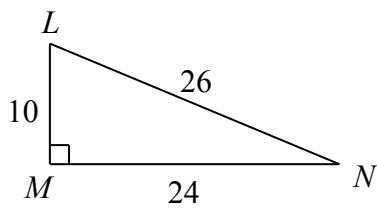


13. Figure X is changed to Figure Y after a single transformation. What is the corresponding transformation?



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

14.

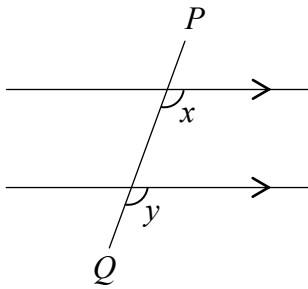


According to the figures above, which of the following is correct?

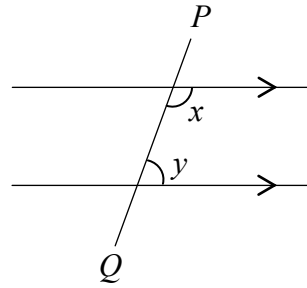
- A. $\triangle LMN \sim \triangle PQR$ (SAS)
- B. $\triangle LMN \sim \triangle PQR$ (SSS)
- C. $\triangle LMN \sim \triangle PQR$ (RHS)
- D. $\triangle LMN \sim \triangle PQR$ (3 sides proportional)

15. In each of the following figures, PQ is a straight line. Which figure shows that x and y are a pair of corresponding angles?

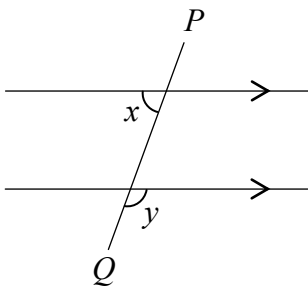
A.



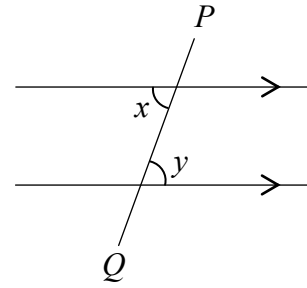
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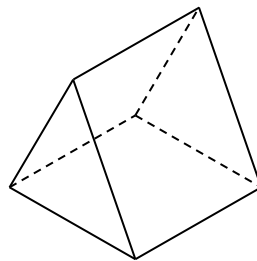
C.



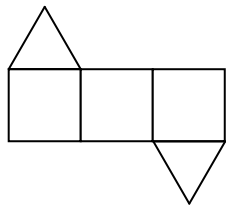
D.



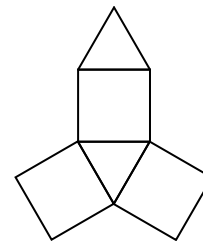
16. Which of the following nets **CANNOT** be folded into a right prism with equilateral triangles as bases?



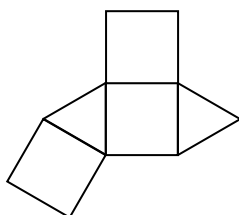
A.



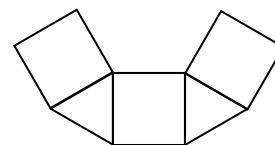
B.



C.

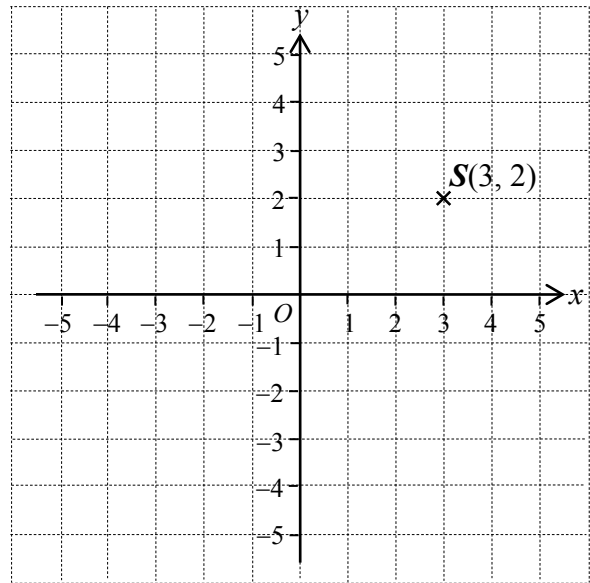


D.



17. In the figure, $S(3, 2)$ is reflected about the x -axis to S' . Find the coordinates of S' .

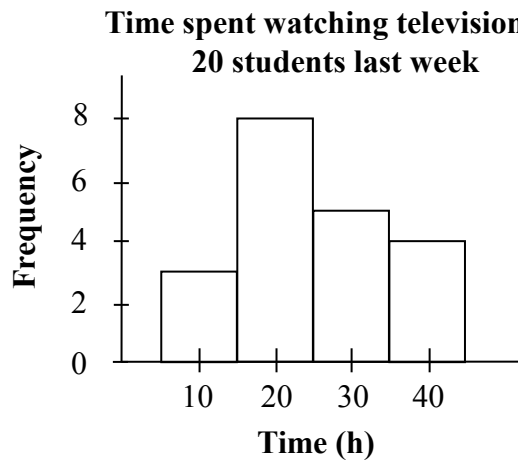
- A. $(3, -2)$
- B. $(-2, 3)$
- C. $(-3, 2)$
- D. $(-3, -2)$



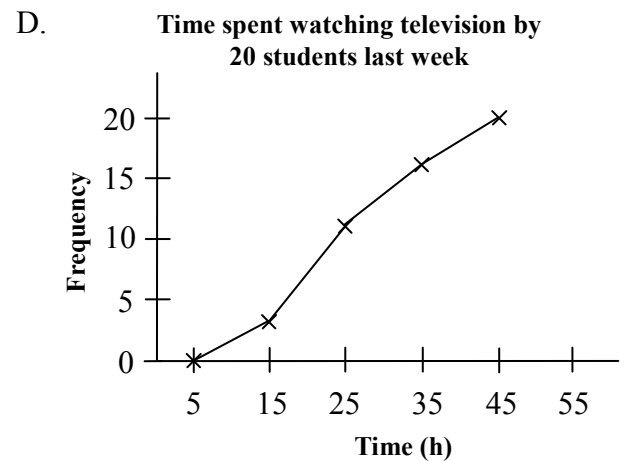
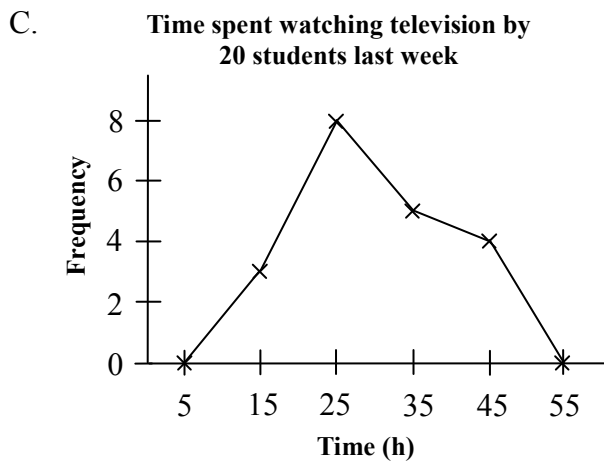
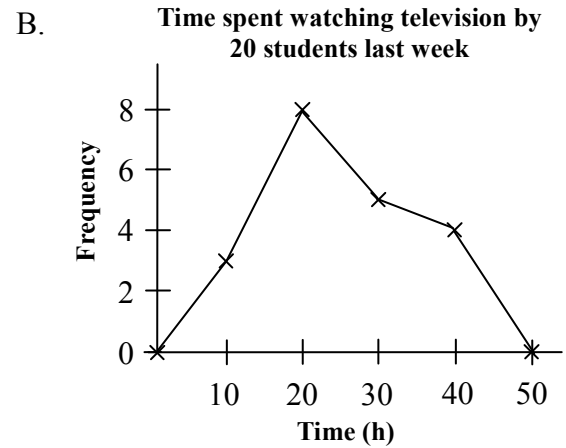
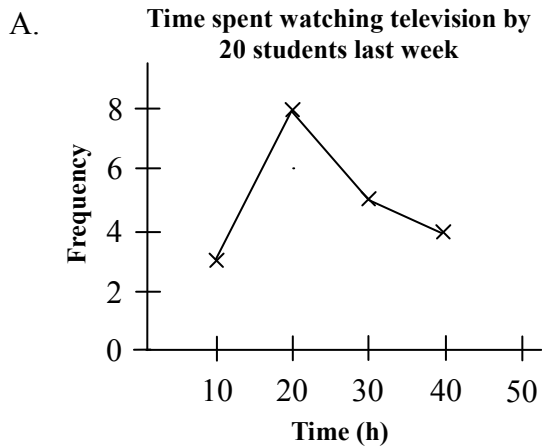
18. $A(5, 4)$ and $B(-1, -6)$ are two points in the rectangular coordinate plane. The coordinates of the mid-point of AB are

- A. $\left(\frac{5+(-1)}{2}, \frac{4+(-6)}{2}\right)$.
- B. $(5+(-1), 4+(-6))$.
- C. $\left(\frac{5-(-1)}{2}, \frac{4-(-6)}{2}\right)$.
- D. $(5-(-1), 4-(-6))$.

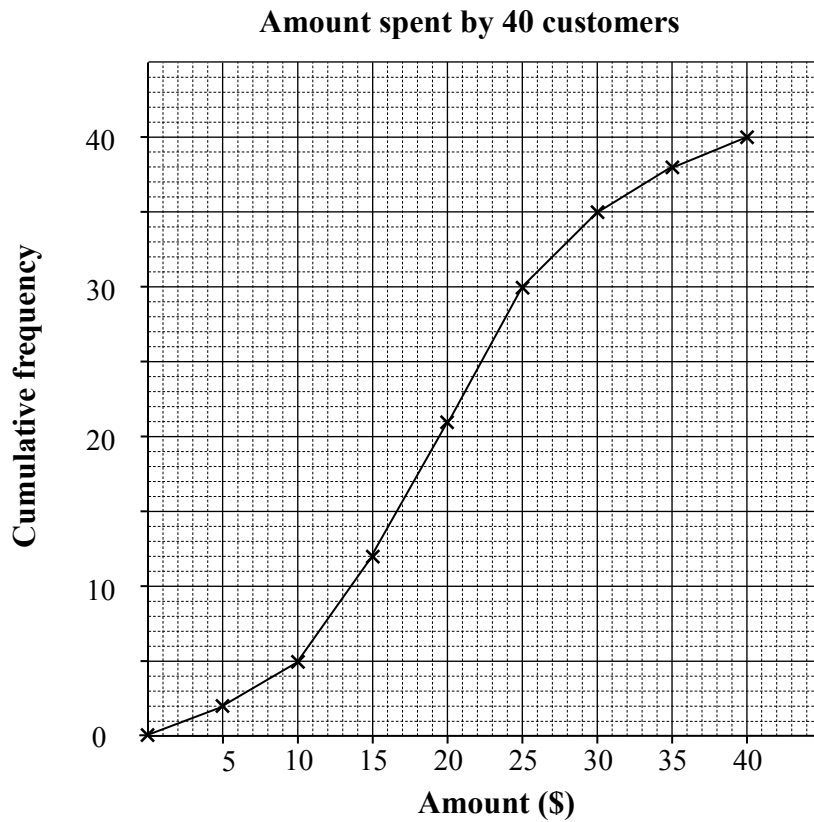
19. The histogram below shows the time spent (h) watching television by 20 students last week:



If the above data are presented by a frequency polygon, which of the following diagrams could be obtained?



20. The cumulative frequency polygon below shows the amount spent by 40 customers in a convenience store.

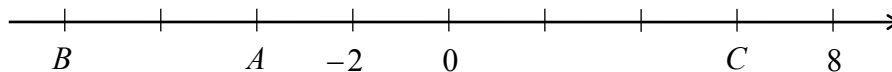


If the amount spent by a customer is \$30 or above, the customer can get a pack of tissues for free. Find the number of customers who can get a pack of tissues for free.

- A. 35
- B. 25
- C. 15
- D. 5

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

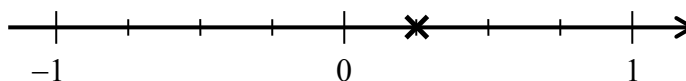
21. Write down the numbers represented by A , B and C on the number line below.



22. Round off 4.065 8 to 3 significant figures.

23. Use the symbol 'x' to mark the number $-\frac{3}{4}$ on the number line given in the **ANSWER BOOKLET**.

Example: $\frac{1}{4}$ is marked on the number line below.



24. The n^{th} term of a sequence is $5n - 2$. Find the value of the 4^{th} term of the sequence.

25. Expand $2a(3a + 1)$.

26. Factorize $a(y + 1) + 4(y + 1)$.

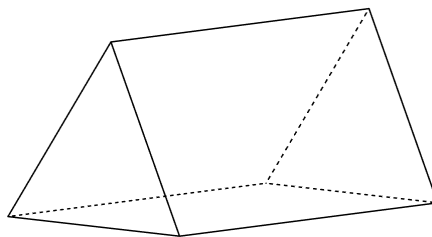
27. Factorize $1 - y^2$.

28. Simplify $\left(\frac{4y}{x}\right)\left(\frac{x^2}{y}\right)$.

29. Make T the subject of the formula $W = 5 + \frac{T}{2}$.

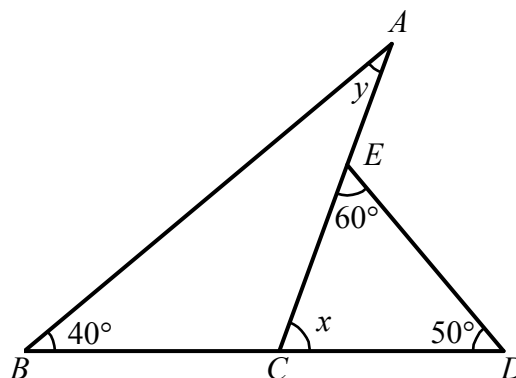
30. Solve the inequality $5x + 6 > 21$.

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

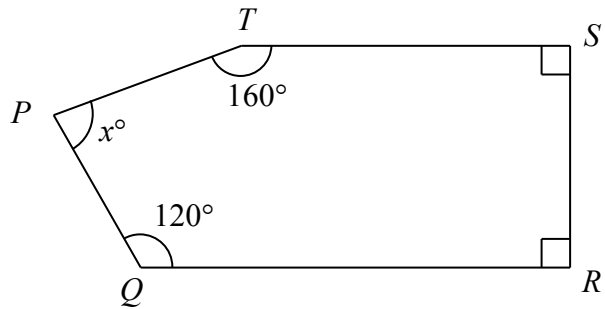


Referring to the sketching shown above, add 1 solid line and 2 dotted lines in the figure provided in the **ANSWER BOOKLET** so as to form a diagram of a **pyramid with square base**.

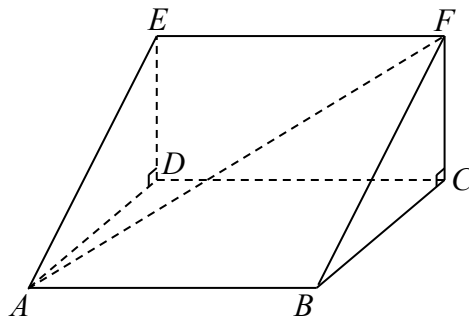
32. In the figure, both AEC and BCD are straight lines. $\angle ABC = 40^\circ$, $\angle CDE = 50^\circ$ and $\angle CED = 60^\circ$. Find x and y .



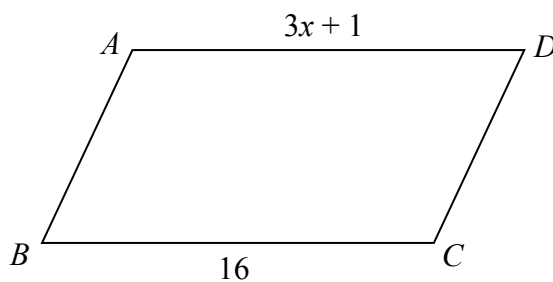
33. The figure shows a pentagon $PQRST$. Find the value of x .



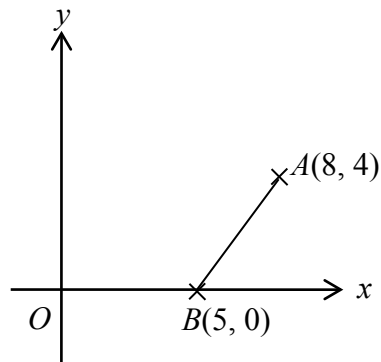
34. The figure shows a triangular prism. $ABCD$ and $CFED$ are rectangles. $ABCD$ is a horizontal plane and $CFED$ is a vertical plane. Name the projection of AF on the plane $ABCD$.



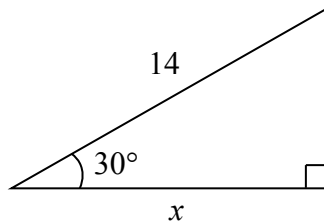
35. In the figure, $ABCD$ is a parallelogram. Find the value of x .



36. Find the distance between two points $A(8, 4)$ and $B(5, 0)$ in the rectangular coordinate plane.



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



38. The following data show the rainfall record (mm) of City A in the past 5 days:

26, 50, 14, 60, 20

Find the mean and median of the above data.

39. The table below shows the number of books borrowed from the school library by 200 students in the first term.

Number of books	0 – 9	10 – 19	20 – 29	30 – 39	40 – 49
Frequency	27	56	78	32	7

From the above information, find the modal class of the number of books borrowed.

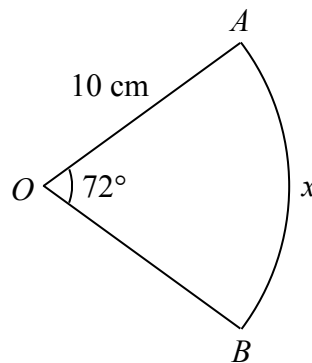
SECTION C: All working must be clearly shown.

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

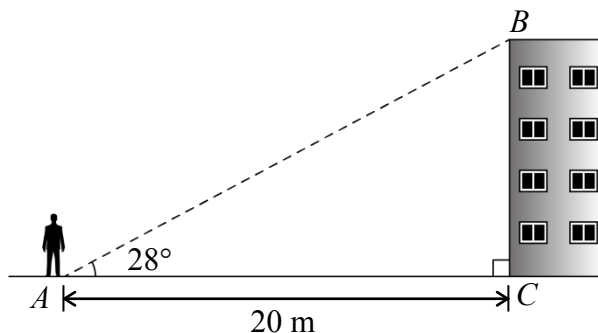
40. Karen deposits \$12 560 in a bank. The interest rate is 2% p.a. compounded yearly. Find the compound interest she will receive after 3 years. Give the answer correct to the nearest dollar.

41. The value of a notebook computer was \$8 400 two years ago and its depreciation rate is 25% per year. What is the value of the notebook computer this year?

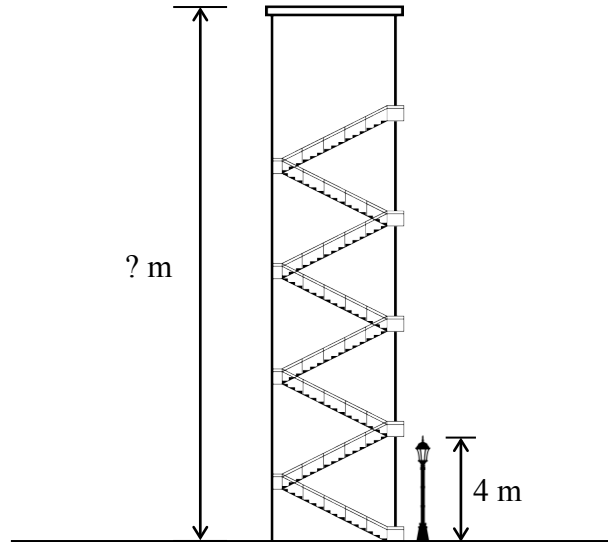
42. In the figure, the radius of sector OAB is 10 cm and $\angle AOB = 72^\circ$. If the arc length of the sector is x , find x . Express the answer in terms of π .



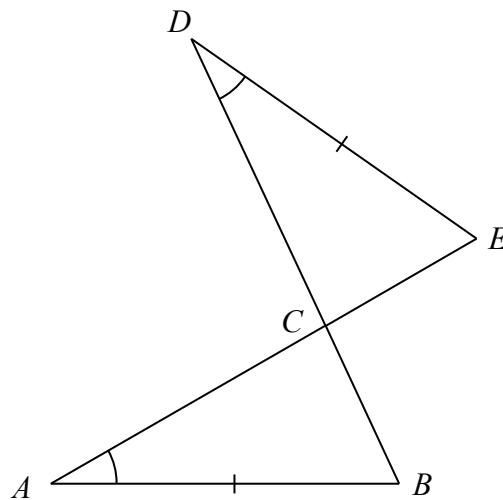
43. In the figure, Peter is standing at point A and his horizontal distance from a building is 20 m. The angle of elevation of the top B of the building from point A is 28° . BC is the height of the building. Find BC . (Correct to 3 significant figures)



44. The figure shows a building and a lamppost. The height of the lamppost is 4 m. Estimate the height of the building and explain your estimation method.



45. In the figure, AE and BD intersect at C , $\angle CAB = \angle CDE$ and $AB = DE$. Prove that $\triangle ABC \cong \triangle DEC$.



46. Complete the table for the equation $3x + 2y - 6 = 0$ in the **ANSWER BOOKLET**.

x	-2	0	4
y	6		

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

47. The table below shows the weights of school bags of 50 students.

Weight (kg)	0 – 2	3 – 5	6 – 8	9 – 11
Frequency	6	9	27	8

- (a) According to the above table, complete the frequency distribution table in the **ANSWER BOOKLET**.
- (b) Find the mean weight of school bags of the 50 students.

END OF PAPER

Do not write on this page.

Answers written on this page will not be marked.

