

<b>9</b>	<b>M</b>	<b>E</b>	<b>1</b>	<b>(</b>	<b>Q</b>	<b>)</b>
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**Education Bureau**  
**Territory-wide System Assessment 2018**  
**Secondary 3 Mathematics**  
**QUESTION BOOKLET**

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**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) Miss Wong recorded the marks of 3A students who attempted the mathematics test yesterday.
- (ii) A newspaper reported the number of people in Shatin watching the dragon boat racing on Tuen Ng Festival.

	(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. At present, Wendy and her mother are 15 and 45 years old respectively. After 5 years, find the ratio of the age of Wendy to the age of her mother.

- A. 1 : 3
- B. 2 : 5
- C. 3 : 10
- D. 4 : 9

3.  $(-a)^2 - (-a^2) =$

- A. 0.
- B.  $a^4$ .
- C.  $-2a^2$ .
- D.  $2a^2$ .

4. Which of the following polynomials has like terms?

- A.  $4a + 4b$
- B.  $2a^2 + 3a$
- C.  $3a^2b - 7ab^2$
- D.  $8ab + 5ab$

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

(i)	$(2x + 3)(x - 1)(x + 4)$ $= 2x^3 + 9x^2 + x - 12$
(ii)	$2x^3 + 9x^2 + x - 12$ $= (2x + 3)(x - 1)(x + 4)$

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

6. Andy is 3 times as old as his daughter. The difference between their ages is 32 years. It is given that Andy and his daughter are  $x$  years old and  $y$  years old respectively. Which of the following pairs of simultaneous equations shows the relation between  $x$  and  $y$ ?

- A.  $\begin{cases} x = 3y \\ y - x = 32 \end{cases}$
- B.  $\begin{cases} x = 3y \\ x - y = 32 \end{cases}$
- C.  $\begin{cases} y = 3x \\ x - y = 32 \end{cases}$
- D.  $\begin{cases} y = 3x \\ y - x = 32 \end{cases}$

7. Which of the following is an identity?

A.  $3x^2 + 6 = 3(x^2 + 2)$

B.  $x^2 + 3 = x(x + 3)$

C.  $4(x + 3) = 3(x + 4)$

D.  $x + 3 = x + 2$

8. The adult fare of a bus route is \$ $x$ . The child fare is half of the adult fare. If the total fare of 4 adults and 3 children is more than \$37, which of the following inequalities can be used to find the range of values of  $x$ ?

A.  $4x + 3\left(\frac{x}{2}\right) > 37$

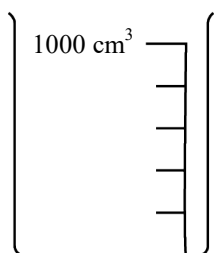
B.  $4x + 3\left(\frac{x}{2}\right) < 37$

C.  $4x + 3\left(x - \frac{1}{2}\right) > 37$

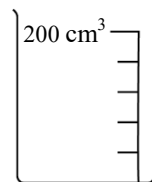
D.  $4x + 3\left(x - \frac{1}{2}\right) < 37$

9. Connie measures the volume of orange juice obtained by squeezing an orange. Which of the following containers can give a more accurate measurement?

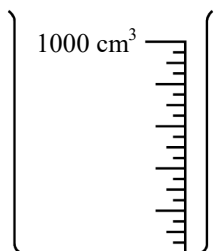
A.



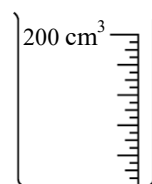
B.



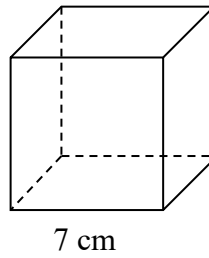
C.



D.



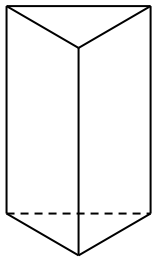
10. The figure shows a solid cube of side 7 cm. Find its total surface area.



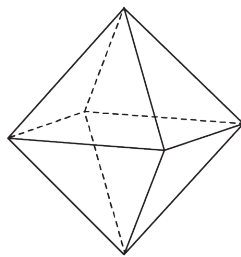
- A.  $49 \text{ cm}^2$
- B.  $84 \text{ cm}^2$
- C.  $294 \text{ cm}^2$
- D.  $343 \text{ cm}^2$

11. Which of the following figures can represent a regular polyhedron?

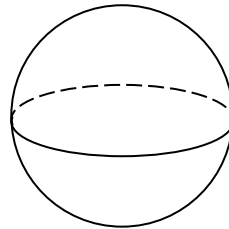
A.



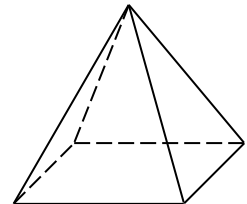
B.



C.

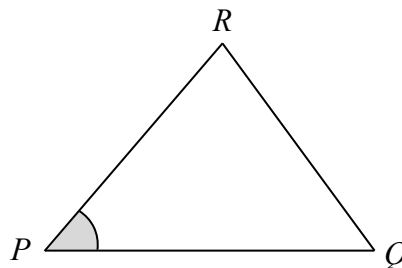


D.

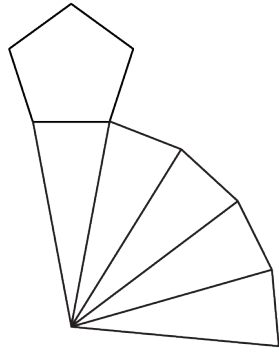


12. Which of the following represents the angle marked in the figure?

- A.  $\triangle RPQ$
- B.  $RPQ$
- C.  $\angle RPQ$
- D.  $P$

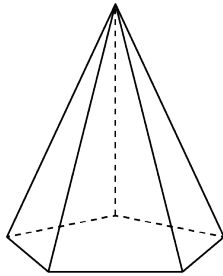


13.

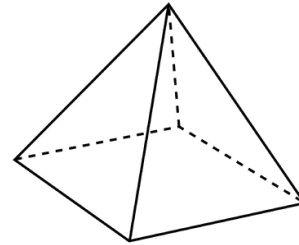


Which of the following 3-D figures can be made by the net above?

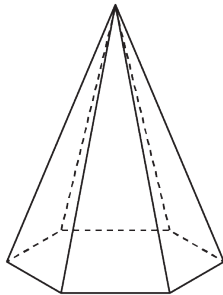
A.



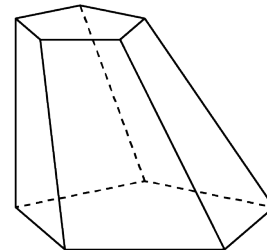
B.



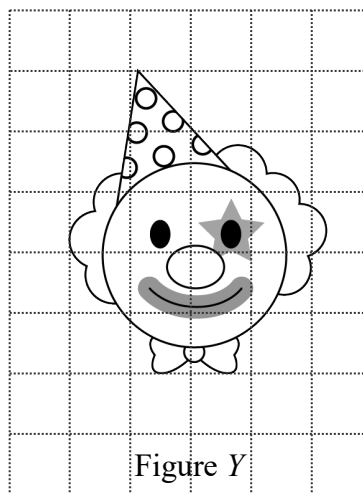
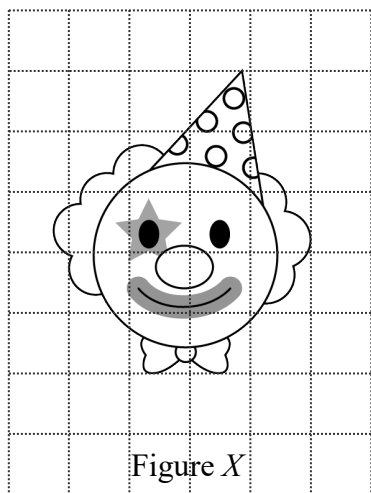
C.



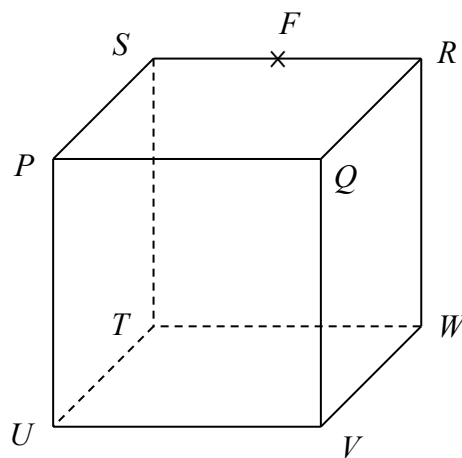
D.



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



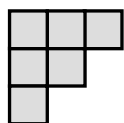
- A. Rotation  
 B. Enlargement  
 C. Reflection  
 D. Translation
15. The figure shows a cube  $PQRSTUWV$ .  $F$  is the mid-point of  $SR$ . Which of the following is an axis of rotational symmetry of the cube?



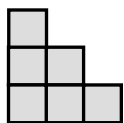
- A.  $SV$   
 B.  $RV$   
 C.  $FU$   
 D.  $PU$



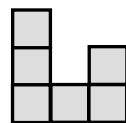
16. The figures below show the 2-D representations of a solid from various views.



top view

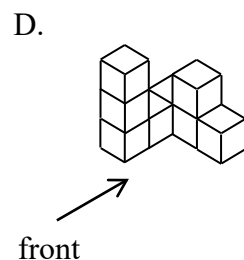
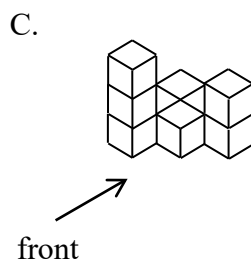
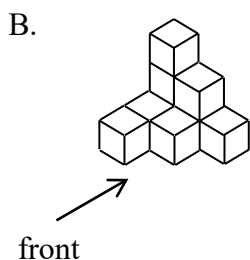
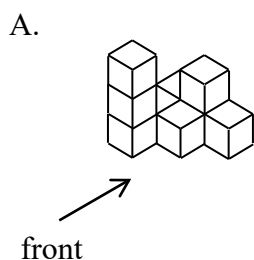


front view



side view

Which of the following could be the solid?

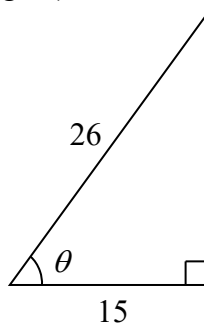


17.  $A(2, 9)$  and  $B(5, 14)$  are two points on a straight line  $L$  in the rectangular coordinate plane. The slope of  $L =$

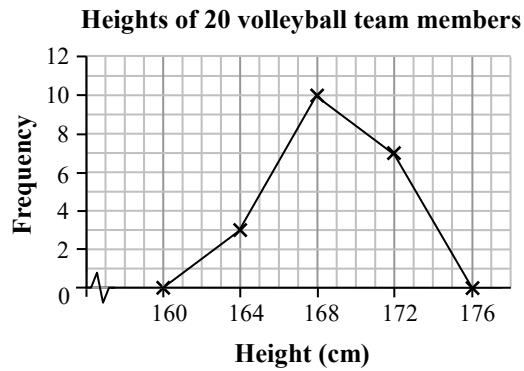
- A.  $\frac{5+2}{14+9}$ .
- B.  $\frac{14+9}{5+2}$ .
- C.  $\frac{5-2}{14-9}$ .
- D.  $\frac{14-9}{5-2}$ .

18. Referring to the figure, find  $\theta$ . (Correct to the nearest degree)

- A.  $30^\circ$
- B.  $35^\circ$
- C.  $55^\circ$
- D.  $60^\circ$

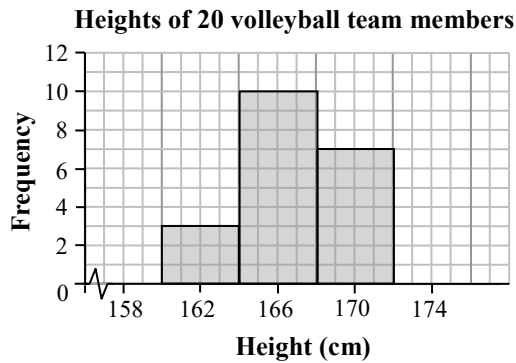


19. The frequency polygon below shows the heights (cm) of 20 volleyball team members:

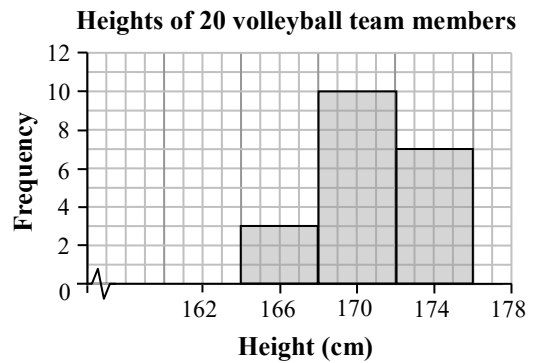


If the same set of data are presented by a histogram, which of the following diagrams could be obtained?

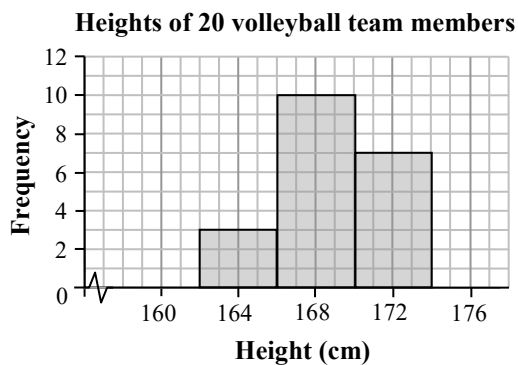
A.



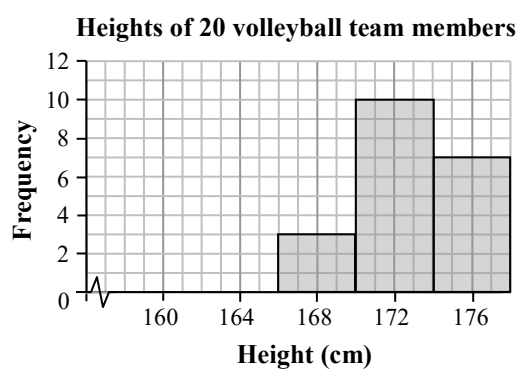
B.



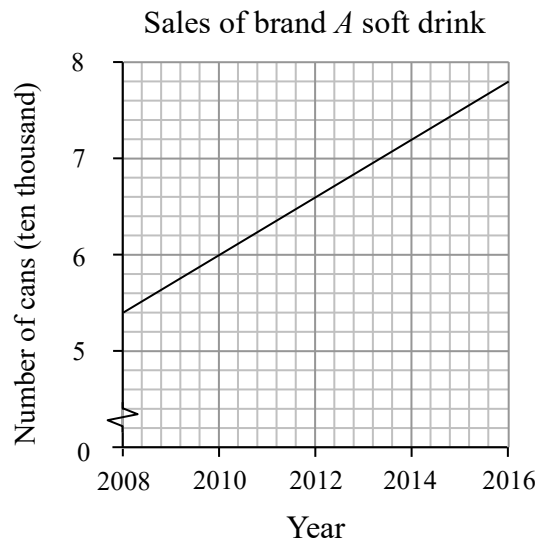
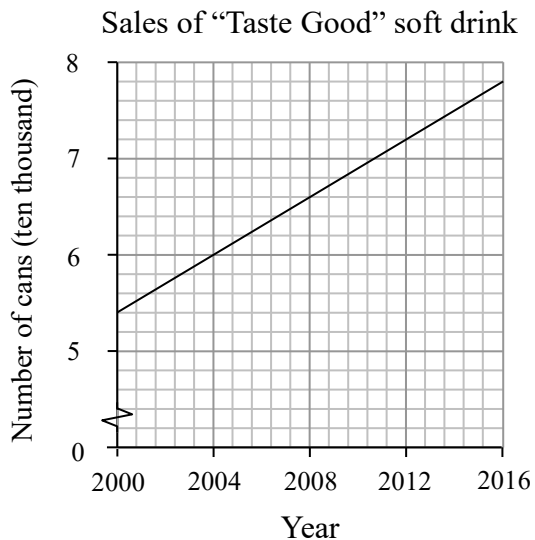
C.



D.



20. A sales officer of “Taste Good” soft drink uses the diagrams below to show the sales of “Taste Good” soft drink and brand *A* soft drink.



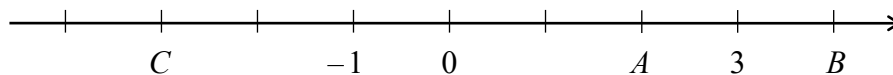
Mr. Chan is the general manager of “Taste Good” soft drink. Based on the diagrams above, he believes that the sales of the two brands of soft drinks are increasing at the same rate.

Which of the following statements is the best reason that Mr. Chan is **misled** by the above diagrams?

- A. The sales of other brands of soft drinks are not shown.
- B. The prices of the two brands of soft drinks are not shown.
- C. The scales of the 2 vertical axes are not the same.
- D. The scales of the 2 horizontal axes are not the same.

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. The thickness of a microwave wrap is about 0.000 93 cm. Use scientific notation to represent this thickness.
23. The length and the width of a desk are in the ratio 5 : 3 . If the length is 120 cm, find the width.

24. A scientific formula is given as follows:

$$s = ut + \frac{1}{2}at^2$$

If  $u = -3$ ,  $t = 4$  and  $a = 10$ , find the value of  $s$ .

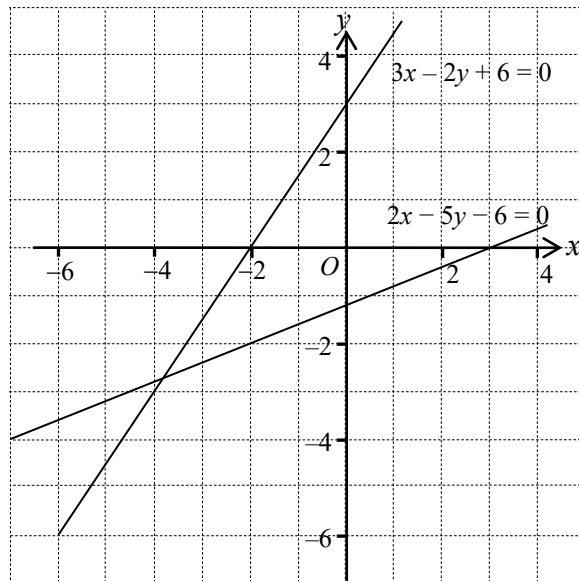
25. The  $n^{\text{th}}$  term of a sequence is  $2n + 7$ . Find the value of the  $5^{\text{th}}$  term of the sequence.

26. Simplify  $(5 + 9x) - 2x$ .

27. Factorize  $x^2 - 49$ .

28. Solve the equation  $8(x + 1) = 7(x - 1)$ .

29.



The above figure shows the graphs of  $2x - 5y - 6 = 0$  and  $3x - 2y + 6 = 0$ .

According to the given graphs,  $(-4, -3)$  is the \* exact solution / approximate solution

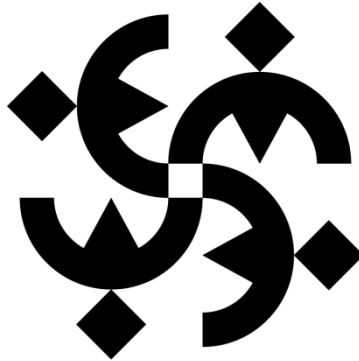
of the simultaneous equations  $\begin{cases} 2x - 5y - 6 = 0 \\ 3x - 2y + 6 = 0 \end{cases}$ .

(\*Circle the correct answer in the **ANSWER BOOKLET**)

30. Solve the inequality  $-2x + 1 < 7$ .

31. The area of a circle is  $289\pi \text{ cm}^2$ . Find its radius.

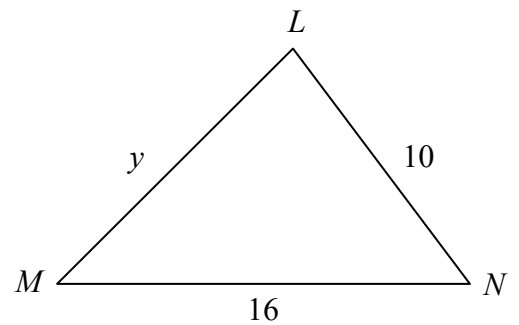
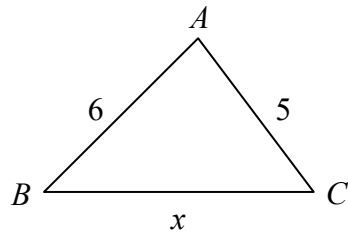
32. The figure below has rotational symmetry. Find its order of rotational symmetry.



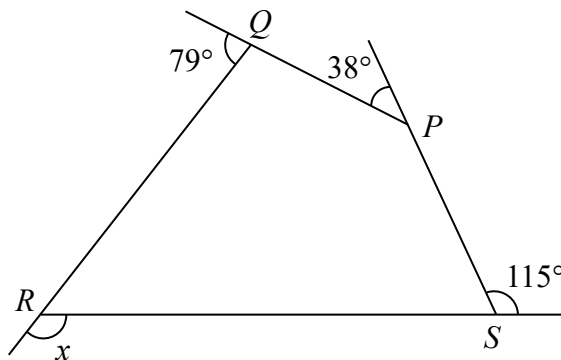
33. In the figure,  $\triangle ABC \sim \triangle LMN$ . Find

(a) the value of  $x$ ,

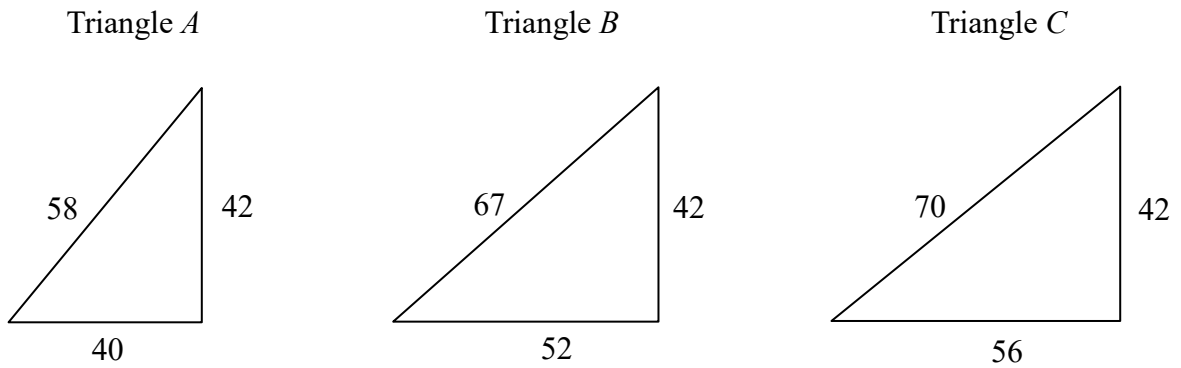
(b) the value of  $y$ .



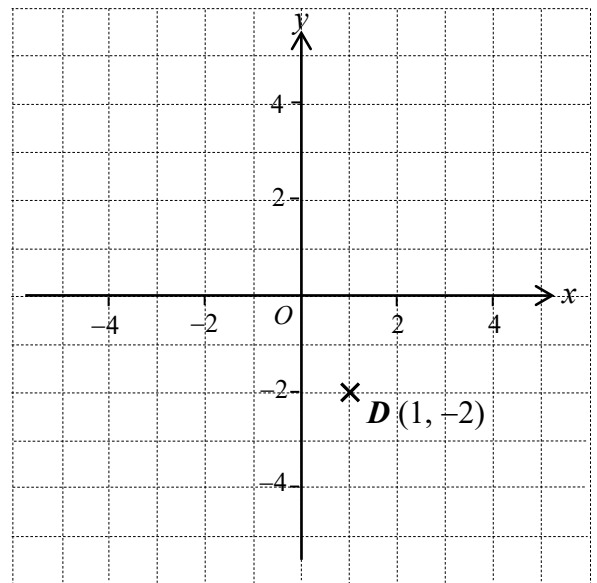
34. The figure shows the exterior angles of a quadrilateral  $PQRS$ . Find  $x$ .



35. Which of the following must be right-angled triangle(s)? (May be more than one answer)



36.  $D(1, -2)$  is translated upwards by 4 units to  $D'$ . Find the coordinates of  $D'$ .

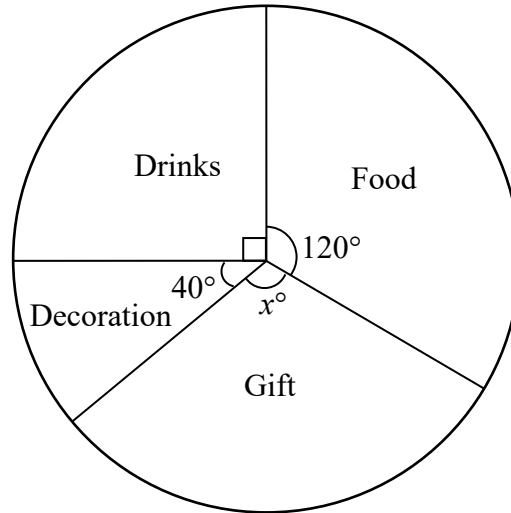


37. Determine whether each of the following data is discrete or continuous.

- (i) The number of extra-curricular activities joined by each Secondary Three student weekly
- (ii) The time spent by each Secondary Three student on extra-curricular activities weekly

38. The pie chart below shows the various expenditures of Kerry's birthday party. The expenditure on decoration is \$480.

**Various expenditures of Kerry's birthday party**



According to the above pie chart, answer the following questions.

- (a) Find the value of  $x$ .
  - (b) Find the total expenditure of the birthday party.
  - (c) What is the difference between the expenditures on food and drinks?
39. The number of students who arrived late for school in the past 5 days are shown below:

8, 4, 0, 7, 11

Find the mean and the median of the above data.

SECTION C: All working must be clearly shown.

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

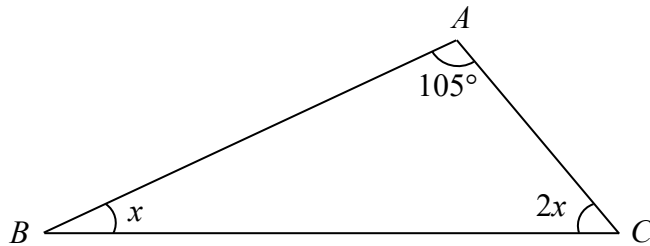
40. Mabel deposits \$3 750 in a bank at a **simple interest rate** of 2% p.a. Find the interest she will receive after 3 years.

41. The value of a pair of diamond earrings is increased by 5% per year. Mandy bought the earrings for \$8 000 three years ago. Find the present value of the earrings.

42. Solve the simultaneous equations  $\begin{cases} 3x + 5y = 31 \\ 3x - 5y = 11 \end{cases}$ .



43. In  $\triangle ABC$ ,  $\angle BAC = 105^\circ$ . Find  $x$ .

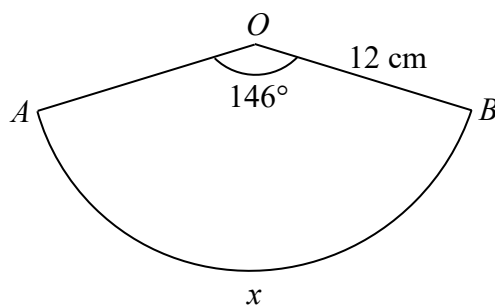


44. Complete the table for the equation  $x - y = 0$  in the **ANSWER BOOKLET**.

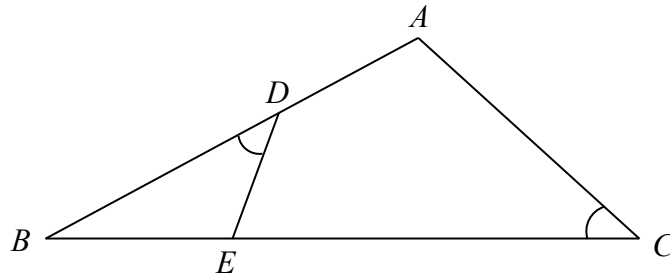
$x$	-3	1	4
$y$		1	

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

45. In the figure, the radius of sector  $OAB$  is 12 cm and  $\angle AOB = 146^\circ$ . Let  $x$  be the arc length of the sector. Find  $x$ . Give the answer correct to 3 significant figures.



46. In the figure,  $ADB$  and  $BEC$  are straight lines.  $\angle ACB = \angle EDB$ . Prove that  $\triangle ABC \sim \triangle EBD$ .



47. The football team, Blue Fighter, participated in 20 matches last year. The results are shown below:

Result	Win	Draw	Lose
Number of matches	8	7	5

It is given that the mode of the results in these 20 matches is “Win”.

Hence the captain claims, “More than half of the results are ‘Win’ in these 20 matches.”

Do you agree with the captain’s claim? Explain your answer.

END OF PAPER

**Do not write on this page.**

**Answers written on this page will not be marked.**

