

Education Bureau Territory-wide System Assessment 2018 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

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Sector	Arc length	=	$2\pi r \times \frac{\theta}{360^{\circ}}$
	Area		$\pi r^2 \times \frac{\theta}{360^\circ}$
Sphere	Surface area Volume	=	$\frac{4\pi r^2}{3}\pi r^3$
Cylinder	Curved surface area Volume		$2\pi rh$ $\pi r^2 h$
Cone	Curved surface area Volume		$\frac{\pi r l}{3} \pi r^2 h$
Prism	Volume	=	base area \times height
Pyramid	Volume	=	$\frac{1}{3}$ × base area × height

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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. $-9.072 \times 10^{-3} =$
 - A. -0.009 072.
 - B. -0.000 907 2.
 - C. 907.2.
 - D. 9072.
- The price of a bottle of orange juice is \$x and the price of a bottle of milk is \$y. Mary pays
 \$500 to buy 3 bottles of orange juice and 4 bottles of milk. What is the change?
 - A. (500 3x 4y)
 - B. (500 3y 4x)
 - C. (3x + 4y 500)
 - D. (3y + 4x 500)

- 4. Which of the following is a polynomial?
 - A. $4x^3 5x^2 + \frac{6}{x} + 1$ B. $4x^3 - 5x^2 + 6x + 1$ C. $4x^3 - 5x^2 + 6\sqrt{x} + 1$ D. $4x^3 - 5x^2 + 6x^{-10} + 1$

5.
$$(-2)^{-5}$$

A. -32.B. 32.C. $-\frac{1}{32}.$ D. $\frac{1}{32}.$

=

6. And y is 3 times as old as his daughter. The difference between their ages is 32 years. It is given that And y 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.
$$\begin{cases} x = 3y \\ y - x = 32 \end{cases}$$

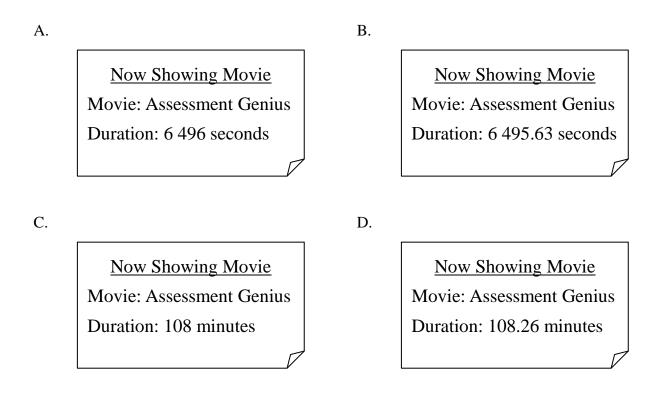
B.
$$\begin{cases} x = 3y \\ x - y = 32 \end{cases}$$

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

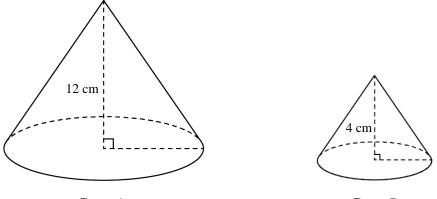
D.
$$\begin{cases} y = 3x \\ y - x = 32 \end{cases}$$

- 7. A music concert has two types of tickets costing \$200 and \$120 each. Mr Chan spends \$2360 to buy 15 tickets, in which the number for the \$200 tickets is x, the remaining are the \$120 tickets. Which of the following equations can be used to find the value of x?
 - A. 120x + 200x = 2360
 - B. $200x + 120 \times 15 = 2360$
 - C. 120x + 200(15 x) = 2360
 - D. 200x + 120(15 x) = 2360
- 8. If x > y, which of the following inequalities is correct?
 - A. $\frac{x}{-7} < \frac{y}{-7}$
 - B. 7x < 7y
 - C. x 7 < y 7
 - D. x + 7 < y + 7
- 9. The length of a school hall is 34 m (correct to the nearest m). Which of the following could be its actual length?
 - A. 33.4 m
 - B. 33.5 m
 - C. 34.5 m
 - D. 35.4 m

10. Which of the following movie information shows the duration of a movie with the most suitable unit and degree of accuracy?



11. In the figure, Cone A and Cone B are similar solids. Their heights are 12 cm and 4 cm respectively. The total surface area of Cone A is $108 \pi \text{ cm}^2$. Find the total surface area of Cone B.

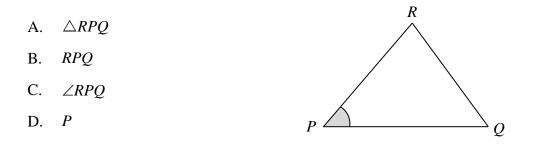




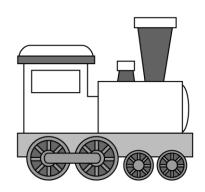
Cone B

- A. $36 \pi \text{ cm}^2$
- B. $18 \pi \text{ cm}^2$
- C. $12 \pi \text{ cm}^2$
- D. $4\pi \text{ cm}^2$

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



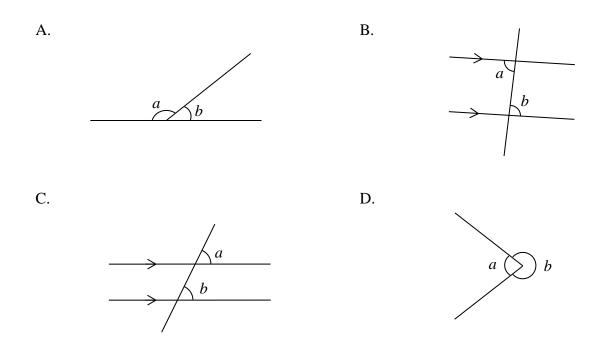
13.



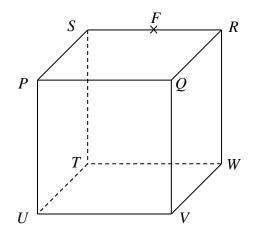
Will the size and shape of the above figure be changed after enlargement?

	Size	Shape
A.	unchanged	changed
B.	unchanged	unchanged
C.	changed	changed
D.	changed	unchanged

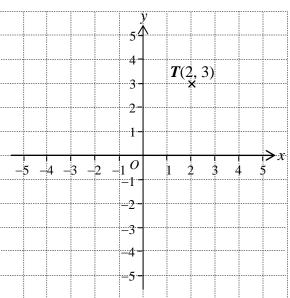
14. Which of the following figures shows that a and b are angles at a point?



- 15. The figure shows a cube PQRSTUVW. 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. In the figure, T(2, 3) is rotated about the origin O through 180° in a clockwise direction to T'. Find the coordinates of T'.
 - A. (-3, -2)
 - B. (-2, 3)
 - C. (2, -3)
 - D. (-2, -3)

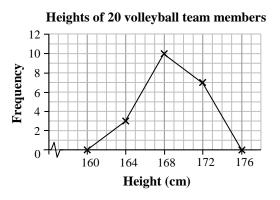


- 17. A (11, 13) and B (8, 4) are two points in the rectangular coordinate plane. The coordinates of the mid-point of AB =
 - A. (11+8, 13+4).
 - B. $\left(\frac{11+8}{2}, \frac{13+4}{2}\right)$.
 - C. (11-8, 13-4).
 - D. $\left(\frac{11-8}{2}, \frac{13-4}{2}\right)$.
- 18. It is given that the slope of a straight line ℓ is 5. Which of the following straight lines is parallel to ℓ ?

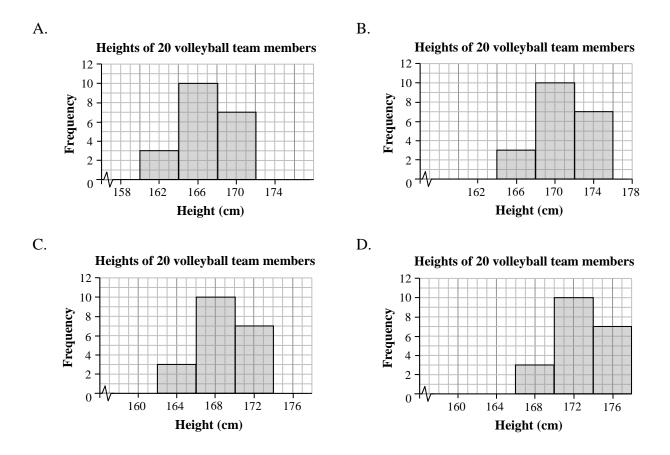
Line	L_1	L_2	L_3	L_4
Slope	-5	$\frac{-1}{5}$	$\frac{1}{5}$	5

- A. L_1
- B. L_2
- C. *L*₃
- D. L_4

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?



20. Student Union investigates the students' opinions on the food quality of the school tuck shop. Which of the following is the most suitable method to collect data?

- A. Conduct a survey of all students using questionnaires.
- B. Interview the school principal.
- C. Search the opening hours of the tuck shop last month.
- D. Observe and record the number of students buying food at the tuck shop during recess on a day.

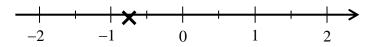
SECTION B: Write ALL the answers in the ANSWER BOOKLET. Working need not be shown.

21. Stephen uses directed numbers to represent the rise and drop in the water level of a reservoir. For example,

+3 cm represents the water level of a reservoir has risen by 3 cm. Use a directed number to represent each of the following situations:

- (i) The water level of Pok Fu Lam Reservoir has risen by 5 cm.
- (ii) The water level of Shing Mun Reservoir has dropped by 4 cm.
- 22. Round off 7.018 56 to 3 significant figures.
- 23. Use the symbol "×" to mark the number 1.25 on the number line given in the ANSWER BOOKLET.

Example: -0.75 is marked on the number line below.



24. A scientific formula is given as follows:

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

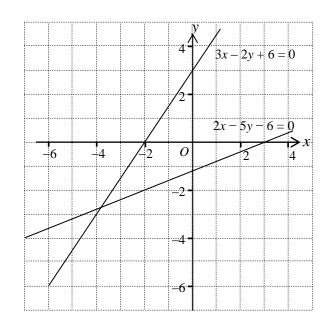
If u = -3, t = 4 and a = 10, find the value of s.

- 25. The n^{th} term of a sequence is 2n+7. Find the value of the 5th term of the sequence.
- 26. Expand (5x+2)(x+1).
- 27. Factorize x^2+4x+4 .

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28. Simplify
$$\frac{1}{2b} \times \frac{b}{3a}$$
.

29.



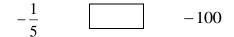
The above figure shows the graphs of 2x-5y-6=0 and 3x-2y+6=0.

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

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

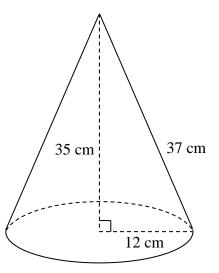
(*Circle the correct answer in the **ANSWER BOOKLET**)

30. In the **ANSWER BOOKLET**, fill in the box with > or < to express the relation between the numbers.

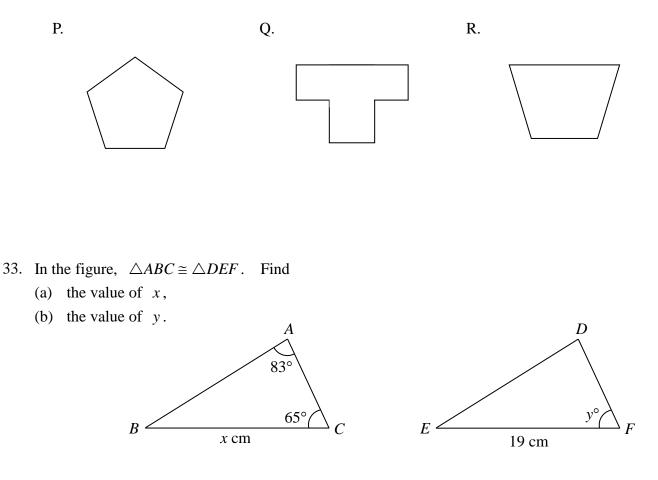


 The figure shows a right circular cone. The height, base radius and slant height are 35 cm, 12 cm and 37 cm respectively.

Find the volume of the cone. Express the answer in terms of π .



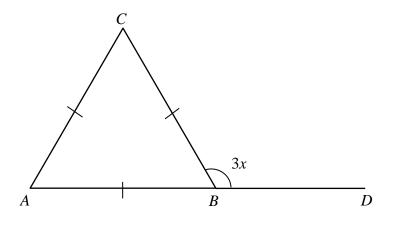
32. Which of the following polygons is / are convex? (May be more than one answer)



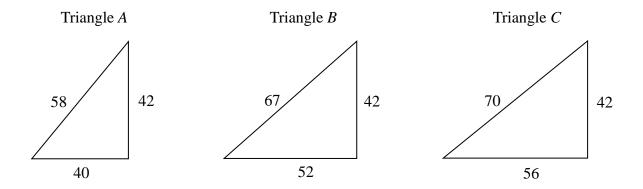
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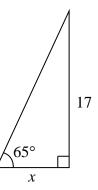
34. In the figure, $\triangle ABC$ is an equilateral triangle. ABD is a straight line. Find x.



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



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



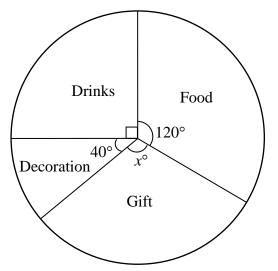
37. The following data show the high jump results (correct to the nearest cm) of 15 students on Sports Day.

112	123	138	121	131
132	128	130	119	133
125	114	136	127	135

Use the data to complete the two frequency distribution tables in the **ANSWER BOOKLET**.

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 table below shows the time spent using mobile phones by 80 students yesterday.

Time (minute)	0 – 29	30 - 59	60 - 89	90 - 119
Frequency	26	32	15	7

Find the modal class of the time spent using mobile phones by the 80 students yesterday.

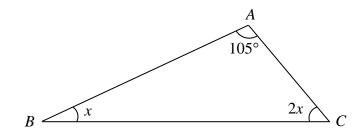
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SECTION C: All working must be clearly shown. Write the mathematical expressions, answers and statements/conclusions in the spaces provided in the ANSWER BOOKLET.

40. The cost of a piece of jewellery is \$5 000. Kelly sells it for \$6 500. Find the profit per cent.

- 41. (a) Simplify $(x^2)^6$ and express the answer with positive index.
 - (b) Simplify $\frac{(x^2)^6}{x^{-5}}$ and express the answer with positive index.

42. In $\triangle ABC$, $\angle BAC = 105^{\circ}$. Find *x*.



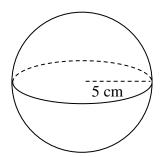
43. Solve the simultaneous equations $\begin{cases} 3x + 5y = 31 \\ 3x - 5y = 11 \end{cases}$.

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

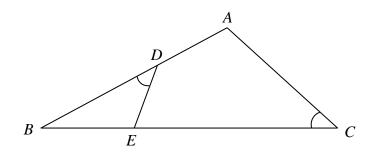
x	-2	2	4
У		0	

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

45. The figure shows a sphere of radius 5 cm. Find the surface area of the sphere. 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 table below shows the highest temperature (correct to the nearest °C) of each month recorded from January to July in a city.

Month	January	February	March	April	May	June	July
Highest temperature (°C)	13	9	16	26	23	32	34

Draw a broken line graph in the **ANSWER BOOKLET** to represent the above data.

END OF PAPER

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Answers written on this page will not be marked.

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