



**Education Bureau**  
**Territory-wide System Assessment 2008**  
**Secondary 3**  
**Mathematics**  
**QUESTION BOOKLET**

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**INSTRUCTIONS**

1. There are 54 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.

## 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	$= \frac{1}{3} \times \text{base area} \times \text{height}$

The diagrams in this paper are not necessarily drawn to scale.

**SECTION A:** Choose the best answer for each question. You should mark all your answers in the ANSWER BOOKLET.

1. Evaluate  $3 - 2(-1)$  .

- A.  $-1$
- B.  $0$
- C.  $1$
- D.  $5$

2. Round off  $0.030\ 981$  to 3 significant figures.

- A.  $0.03$
- B.  $0.031$
- C.  $0.031\ 0$
- D.  $0.030\ 98$

3. A rectangle is  $x$  cm long and 2 cm wide. Find its perimeter.

- A.  $2x$  cm
- B.  $(x + 4)$  cm
- C.  $(2x + 2)$  cm
- D.  $2(x + 2)$  cm

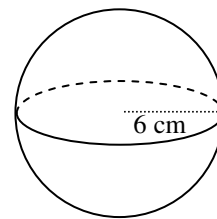
4. Which of the following is a polynomial in  $x$ ?

- A.  $\sqrt{x} + 1$
- B.  $x^2 + 5$
- C.  $\frac{1}{x} + 2$
- D.  $\frac{3}{x+1}$

5. Simplify  $\frac{(c^2)^3}{c^{-3}}$ .
- A.  $c^3$
  - B.  $c^8$
  - C.  $c^9$
  - D.  $c^{11}$
6. Which of the following is a point on the straight line  $2y = x + 3$  ?
- A.  $(-5, -4)$
  - B.  $(-1, 1)$
  - C.  $(2, 1)$
  - D.  $(3, 6)$
7. Which of the following is an identity?
- A.  $2x + 3x = 6x$
  - B.  $2x + 3x = x + 4x$
  - C.  $2 + 3x = 5x$
  - D.  $2 + 3x = 1 + 4x$
8. A student finished a 100 m race in 15 seconds (correct to the nearest second). Which of the following could be his actual finishing time?
- A. 14.0 seconds
  - B. 14.4 seconds
  - C. 15.3 seconds
  - D. 15.9 seconds
9. The circumference of a circular table is  $2\pi$  m. Find the diameter of the table.
- A. 1 m
  - B. 2 m
  - C.  $\sqrt{2}$  m
  - D.  $2\sqrt{2}$  m

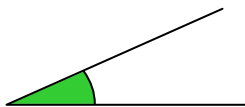
10. The figure shows a sphere of radius 6 cm. Its surface area is

- A.  $36 \pi \text{cm}^2$ .
- B.  $72 \pi \text{cm}^2$ .
- C.  $144 \pi \text{cm}^2$ .
- D.  $288 \pi \text{cm}^2$ .

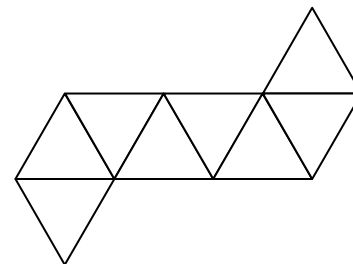


11. In the figure, the marked angle is

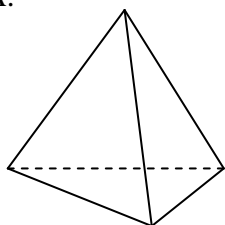
- A. an acute angle.
- B. an obtuse angle.
- C. a reflex angle.
- D. a right angle.



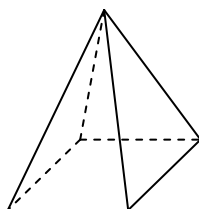
12. Which of the following solids can be made from the net shown on the right?



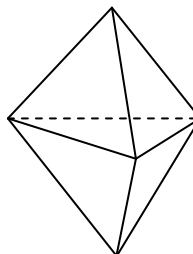
A.



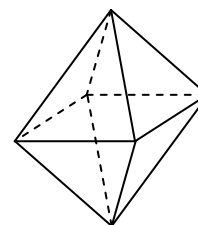
B.



C.

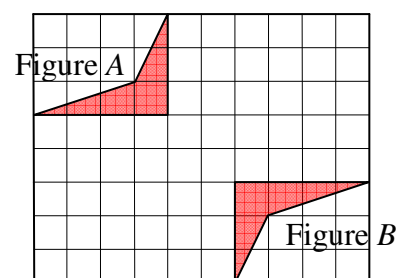


D.

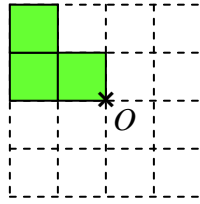


13. Figure A is changed to Figure B after a single transformation. The transformation is

- A. a rotation.
- B. a reflection.
- C. a translation.
- D. an enlargement.

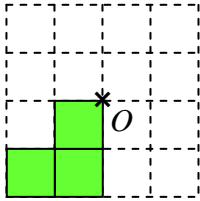


14.

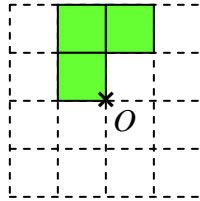


Find the image of the above shaded object after rotating about  $O$  through  $90^\circ$  in clockwise direction.

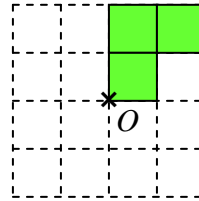
A.



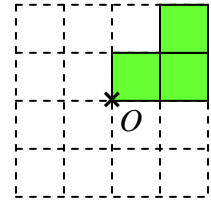
B.



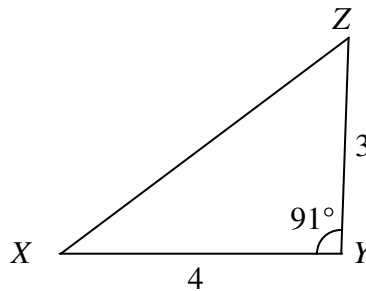
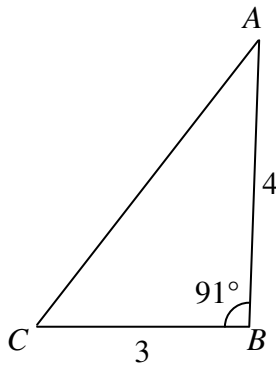
C.



D.



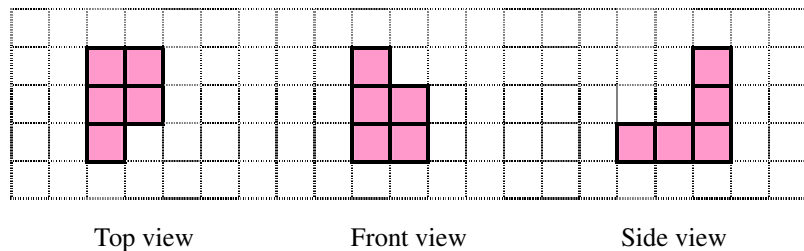
15.



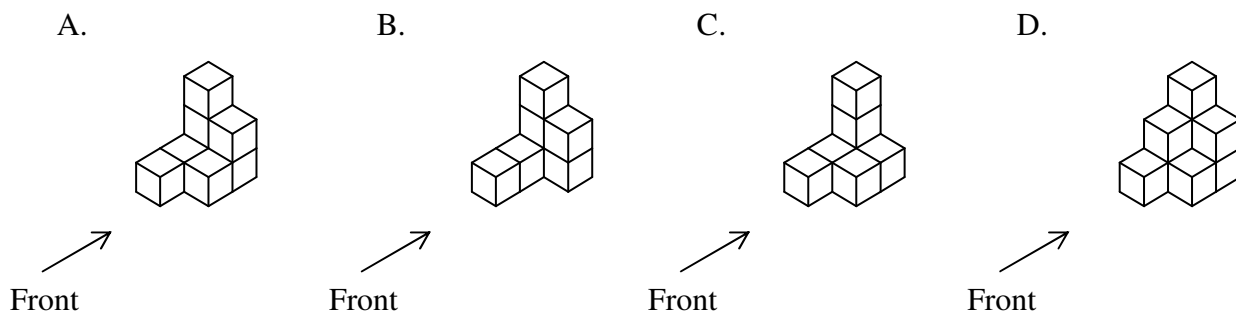
Refer to  $\triangle ABC$  and  $\triangle XYZ$ . Which of the following is correct?

- A.  $\triangle ABC \cong \triangle XYZ$  (RHS)
- B.  $\triangle ABC \cong \triangle XYZ$  (SAS)
- C.  $\triangle ABC \sim \triangle XYZ$  (AAA)
- D.  $\triangle ABC \sim \triangle XYZ$  (3 sides proportional)

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



Which of the following is possibly the solid?

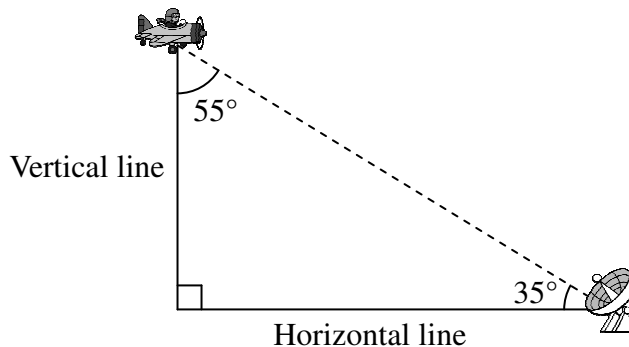


17. Given two points  $P(-2, 0)$  and  $Q(4, 4)$ . Find the mid-point of  $PQ$ .

- A.  $(1, 2)$
- B.  $(3, 2)$
- C.  $(2, 4)$
- D.  $(6, 4)$

18. In the figure, the angle of depression of the radar from the plane is

- A.  $35^\circ$ .
- B.  $55^\circ$ .
- C.  $90^\circ$ .
- D.  $125^\circ$ .

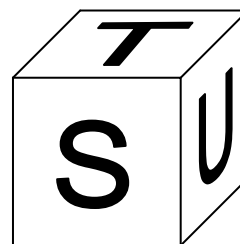


19. The number of visitors of a museum in each month was recorded over the last 18 months. Karen wants to present the monthly number of visitors during this period with a diagram. Which of the following is the most suitable?

- A. Pie chart
- B. Histogram
- C. Broken line graph
- D. Cumulative frequency curve

20. The table below shows the results of rolling a letter cube:

Outcome	Frequency
P	12
Q	5
R	0
S	12
T	10
U	1



Based on these results, find the empirical probability of rolling a “T”.

- A.  $\frac{1}{3}$
- B.  $\frac{1}{4}$
- C.  $\frac{1}{5}$
- D.  $\frac{1}{6}$



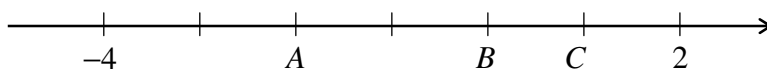
**SECTION B: Write ALL the answers in the ANSWER BOOKLET. Working need not be shown.**

21. A manager uses positive numbers and negative numbers to represent the daily profit and loss of company respectively.

Use suitable numbers to represent the following profit or loss:

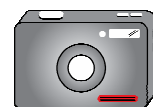
Profit or loss	
(i)	Profit of 1000 dollars
(ii)	Loss of 3000 dollars

22. Find the values of  $A$ ,  $B$  and  $C$  on the number line below.



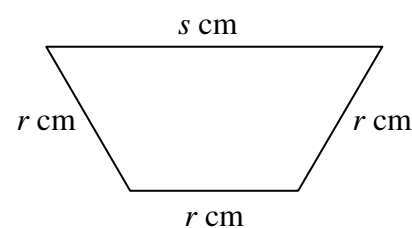
23. Use “ $\times$ ” to mark the number  $-\frac{12}{7}$  on the number line given in the ANSWER BOOKLET.

24. An old model camera was sold for \$1800. The percentage loss was 10%.  
Find the cost of the camera.


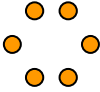
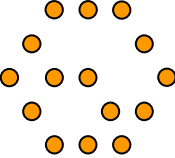
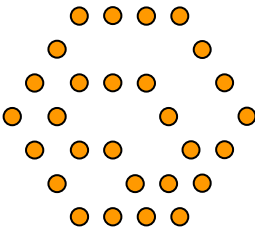


25. The weight of Jackson is 40 kg. Susan is 10 kg heavier than Jackson.  
Find the ratio of the weight of Jackson to the weight of Susan.

26. In the figure, the perimeter of the trapezium is  $P$  cm where  
 $P = 3r + s$ .  
If  $P = 26$  and  $s = 11$ , find the value of  $r$ .



27. The first four figures formed by beads are shown below:

	Figure 1	Figure 2	Figure 3	Figure 4
				
Number of beads	1	6	15	28

Given the number of beads in the  $n^{\text{th}}$  figure is  $n(2n-1)$ .

Find the number of beads in the  $8^{\text{th}}$  figure.

28. Rewrite the polynomial  $4a + 3a^3 - 2 - 5a^2$  in ascending powers of  $a$ .

29. Expand  $(x^3 + 4x - 3)(2x)$ .

30. Factorize  $3cd^2 - 9c^2d$ .

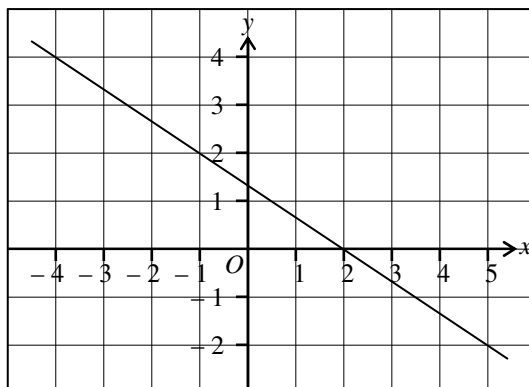
31. Factorize  $3x^2 + 5x + 2$ .

32. There were  $x$  passengers on a bus when it left the first stop. When the bus arrived at the second stop,  $\frac{1}{3}$  of the passengers got off the bus. At the same time, 33 passengers got on the bus. There were 93 passengers on the bus when it left the second stop.

According to the meaning of the question, write an equation in  $x$ .

(You need not solve the equation.)

33.



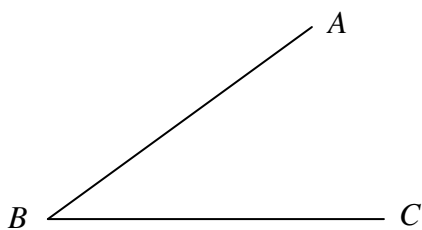
The figure above shows the graph of  $2x + 3y = 4$ . Which of the following points lie on the straight line? (There may be more than one answer.)

$$P(-3, 3), \quad Q(-1, 2), \quad R(0, 1), \quad S(4, -\frac{4}{3})$$

34. Expand  $(2x - 5y)(2x + 5y)$ .

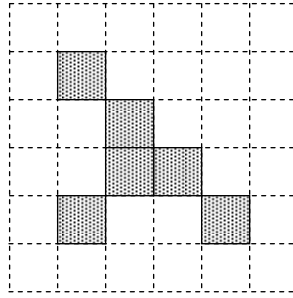
35. Refer to the ANSWER BOOKLET, fill in the boxes with  $>$  or  $<$  to express the relations between the numbers.

36.



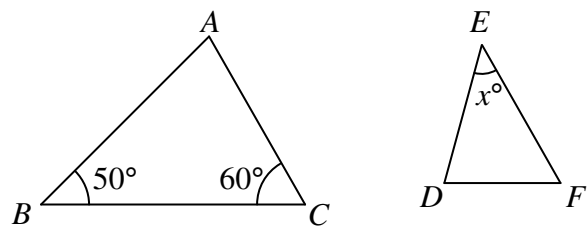
Use suitable notation to represent one of the line segments shown in the above figure.

37.

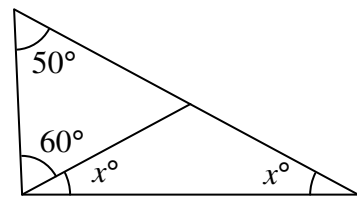


The shaded squares above form a figure with one axis of symmetry. Draw the axis of symmetry in the ANSWER BOOKLET.

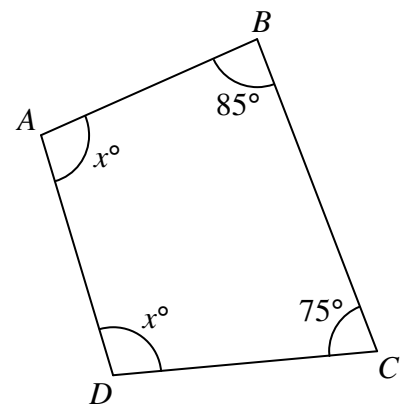
38. In the figure,  $\triangle ABC \sim \triangle DEF$ . Find the value of  $x$ .



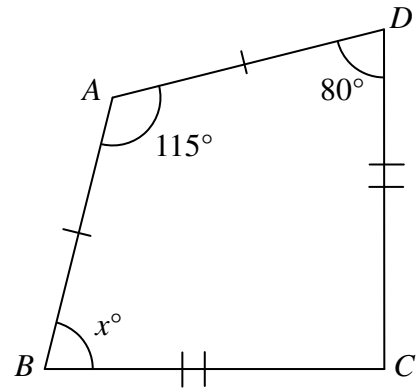
39. Find the value of  $x$  in the figure.



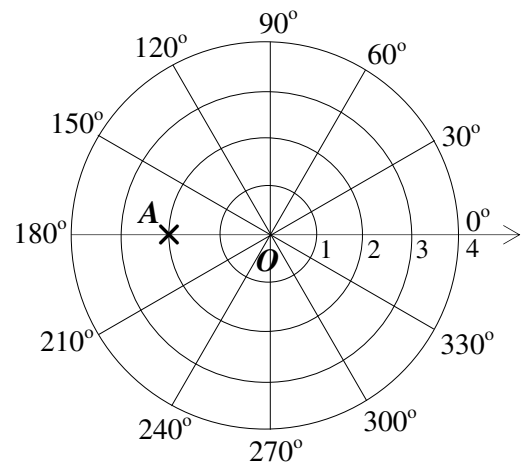
40. The figure shows a quadrilateral  $ABCD$ . Find the value of  $x$ .



41. In the figure,  $ABCD$  is a kite where  $AB = DA$  and  $BC = CD$ .  
Find the value of  $x$ .



42. Find the polar coordinates of point  $A$  in the figure.



43. If  $A(-2, 1)$  and  $B(1, 5)$  are two points in a rectangular coordinate plane, find the distance between  $A$  and  $B$ .

44. In the figure,  $\cos \theta = \frac{1}{3}$ .

Find the value of  $\theta$  correct to the nearest  $0.1^\circ$ .



45. Winnie surveyed the amounts of daily pocket money of some students. The results are shown in the following stem-and-leaf diagram:

Stem (\$10)	Leaf (\$1)
2	2 4 4 5 6
3	1 4 5 6
4	0 4 7 8 9
5	3 4 5 6 7 8

- (a) How many students answered this survey?
- (b) How many students have \$24 daily pocket money?
- (c) What is the largest amount of daily pocket money among the students?
46. The weights in kg of 5 volleyball team members are

40, 75, 55, 60, 49.

Find their mean weight.

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

47.

Wisdom College	
Textbook list	
Secondary 3	
<u>Mathematics:</u>	<u>Price</u>
1. Basic Mathematics 3A	\$ 149.3
2. Basic Mathematics 3B	\$ 149.3
3. Basic Mathematics Workbook 3A	\$ 84.0
4. Basic Mathematics Workbook 3B	\$ 84.0
<u>Science:</u>	
5. Fun With Science 3A	\$ 69.0
6. Fun With Science 3B	\$ 69.0
7. Fun With Science 3C	\$ 69.0

The above figure shows a textbook list of Wisdom College for Secondary 3 mathematics and science. Use a reasonable method to estimate the total amount that a student has to pay for the textbooks on the list. Explain your method of estimation.

48. Donald deposits \$ 30 000 in a bank for 2 years. The interest rate is 4% p.a. compounded yearly. Find the total interest that Donald will receive.

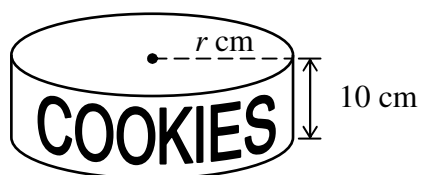
49. Complete the following table for the equation  $2y = x + 4$  in the ANSWER BOOKLET:

$x$	-4	0	4
$y$			4

Draw the graph of this equation on the rectangular coordinate plane given in the ANSWER BOOKLET.

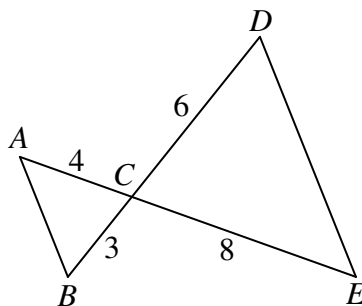
50. Solve the simultaneous equations  $\begin{cases} 2x + 5y = 9 \\ 3x - 4y = 2 \end{cases}$ .

51.



The figure above shows a cylindrical cookie can. Its height is 10 cm and volume is  $1960 \pi \text{ cm}^3$ . The radius of the can is  $r$  cm. Find the value of  $r$ .

52.



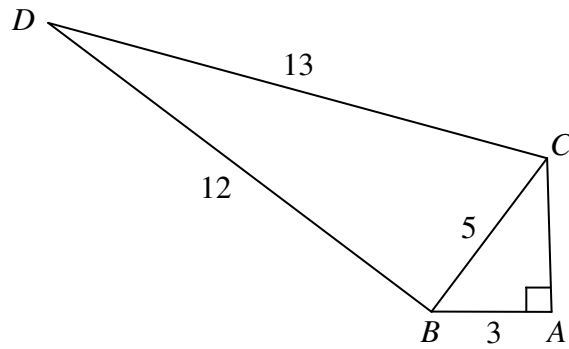
In the figure,  $ACE$  and  $BCD$  are straight lines.

$AC = 4$ ,  $BC = 3$ ,  $CD = 6$  and  $CE = 8$ .

Prove that  $\triangle ABC \sim \triangle EDC$ .



53.



In the figure,  $\angle BAC = 90^\circ$ ,  $AB = 3$ ,  $BC = 5$ ,  $BD = 12$ , and  $CD = 13$ .

(a) Find  $AC$ .

(b) Is  $\triangle BDC$  a right-angled triangle? Explain your answer.

54. The following is the cumulative frequency table for the time taken by 30 students to do their projects:

Time less than (hours)	1	2	3	4	5
Total number of students	3	12	23	28	30

According to the data, draw the cumulative frequency curve.

**END OF PAPER**





