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

INSTRUCTIONS

1. There are 56 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	$= 2\pi rh$
	Volume	$= \pi r^2 h$
Cone	Curved surface area	$= \pi rl$
	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. Which of the following algebraic expressions is equivalent to $-(3x)^2$?

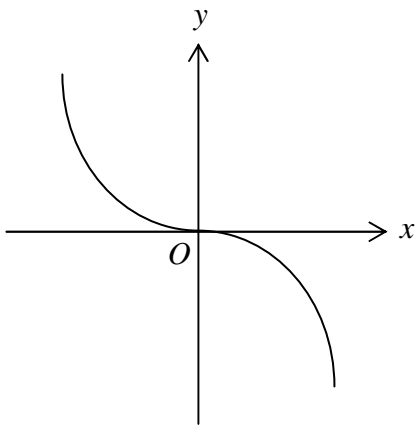
- A. $3x^2$
- B. $-3x^2$
- C. $9x^2$
- D. $-9x^2$

4. $4^{-2} =$

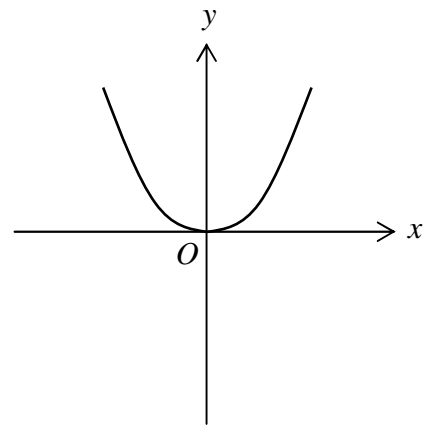
- A. -8
- B. $\frac{1}{8}$
- C. -16
- D. $\frac{1}{16}$

5. Which of the following may represent the graph of the equation $x + y = 0$?

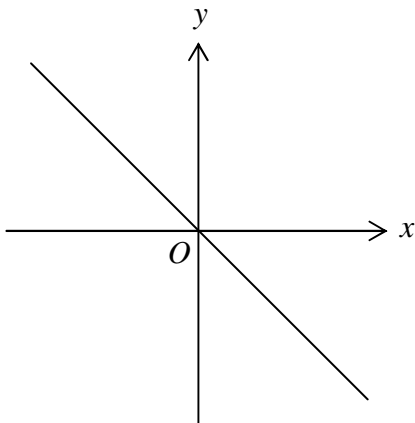
A.



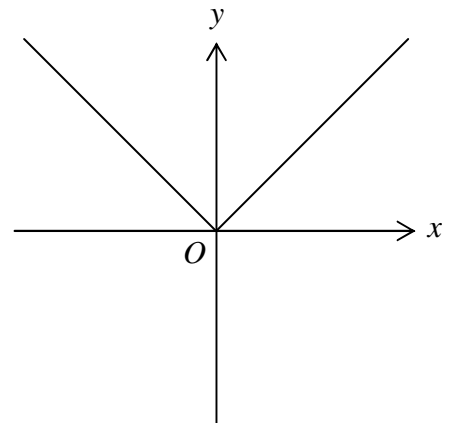
B.



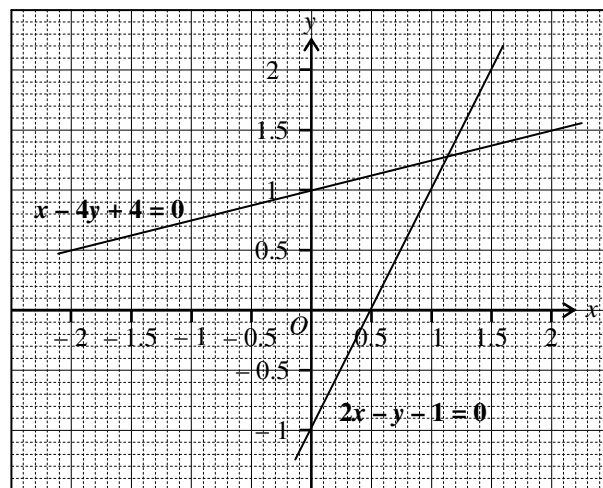
C.



D.



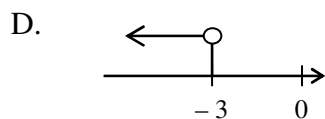
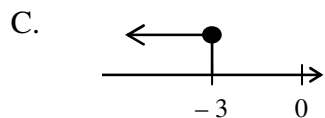
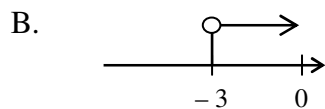
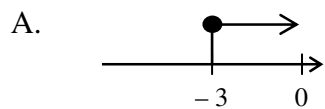
6.



Solve graphically $\begin{cases} x - 4y + 4 = 0 \\ 2x - y - 1 = 0 \end{cases}$.

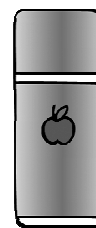
- A. The exact solution is $(1, 1.5)$.
- B. The exact solution is $(1.1, 1.3)$.
- C. The approximate solution is $(1, 1.5)$.
- D. The approximate solution is $(1.1, 1.3)$.

7. Which of the following diagrams represents $x \leq -3$?



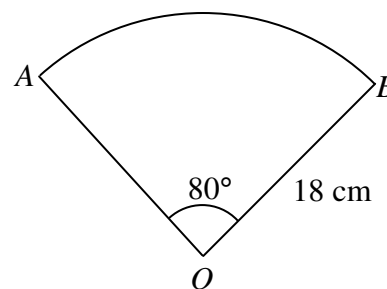
8. Kitty wants to find the circumference of a flask. Which of the following items should she choose to wrap around the flask for the most accurate measurement?

- A. Nylon string
- B. Elastic band
- C. Leather belt
- D. Thick rope



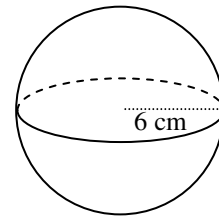
9. In the figure, the radius of the sector OAB is 18 cm. Find the arc length \widehat{AB} .

- A. 4π cm
- B. 8π cm
- C. 36π cm
- D. 72π cm



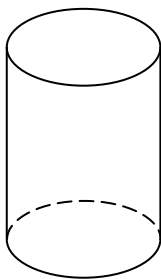
10. The figure shows a solid sphere of radius 6 cm. Find the volume of the sphere correct to the nearest cm^3 .

- A. 113 cm^3
- B. 288 cm^3
- C. 452 cm^3
- D. 905 cm^3

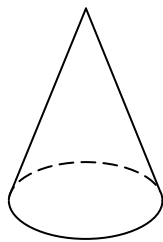


11. Which of the following figures can represent a regular polyhedron?

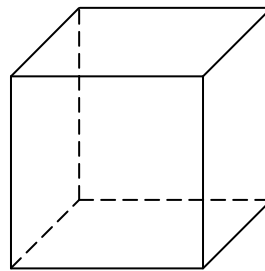
A.



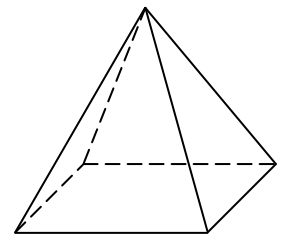
B.



C.

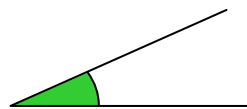


D.

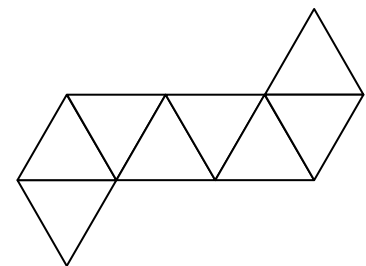


12. In the figure, the marked angle is

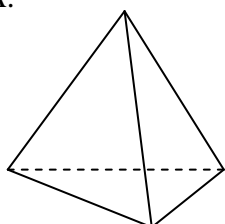
- A. an acute angle.
- B. an obtuse angle.
- C. a reflex angle.
- D. a right angle.



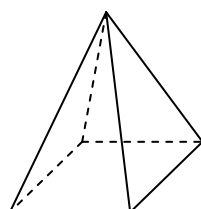
13. Which of the following solids can be made from the net shown on the right?



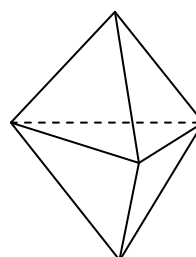
A.



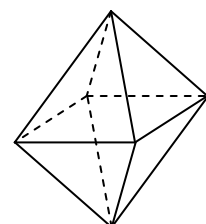
B.



C.



D.



14.

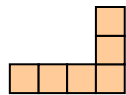


Figure 1

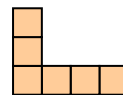
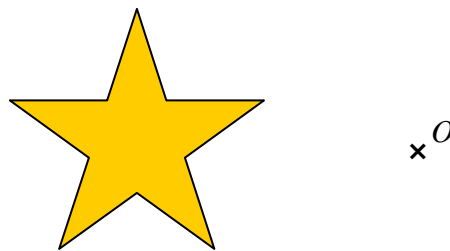


Figure 2

Figure 1 is changed to Figure 2 after a single transformation. The transformation is

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

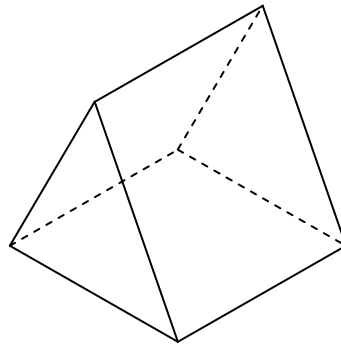
15.



Will the size and shape of the above figure be changed when it is rotated about O through 90° in clockwise direction?

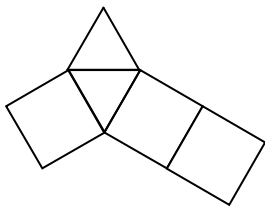
- | | <u>Size</u> | <u>Shape</u> |
|----|-------------|--------------|
| A. | changed | changed |
| B. | changed | not changed |
| C. | not changed | changed |
| D. | not changed | not changed |

16.

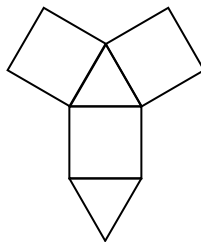


Which of the following nets can be folded into the triangular prism shown above?

A.



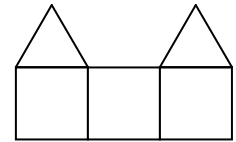
B.



C.



D.

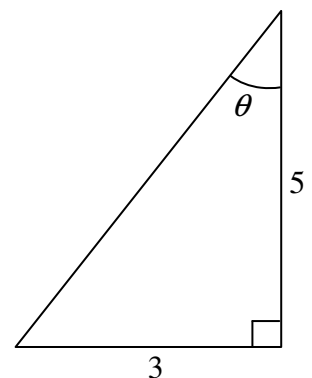


17. If $A(3, 1)$ and $B(-2, -3)$ are two points in a rectangular coordinate plane, find the slope of the straight line AB .

- A. $\frac{5}{4}$
- B. $\frac{4}{5}$
- C. $-\frac{1}{2}$
- D. -2

18. Refer to the figure. Find the value of θ correct to the nearest degree.

- A. 31°
- B. 37°
- C. 53°
- D. 59°



19. Which of the following data is discrete?

- A. The heights of 30 students
- B. The numbers of students in 29 classes
- C. The time records of 8 runners
- D. The lengths of 10 cars

20. On the first day of school, Maggie surveyed the amount of money brought to school of ten students. The results are as follows:

\$20, \$20, \$20, \$30, \$5, \$30, \$20, \$30, \$1000, \$20.

She said: “The arithmetic mean of the amounts is \$119.5. So, most of these ten students brought more than \$100 to school.”

Which of the following best explains why Maggie’s saying is misleading?

- A. Maggie did not get the correct arithmetic mean.
- B. The extreme value easily affected the arithmetic mean.
- C. The data values were not arranged in order.
- D. The median was not equal to the arithmetic mean.

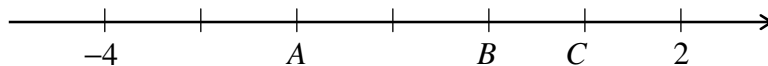
SECTION B: Write ALL the answers in the ANSWER BOOKLET. Working need not be shown.

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

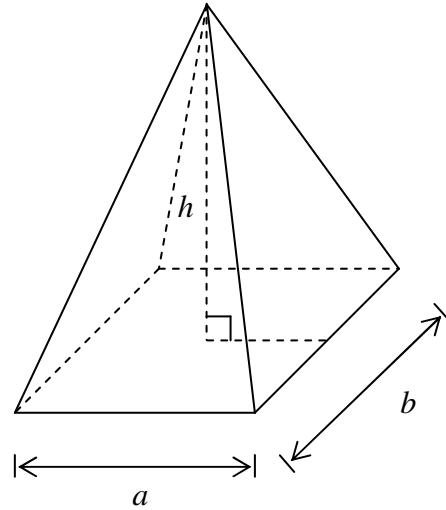
22. Find the values of A , B and C on the number line below.



23. Use scientific notation to represent 0.000 000 023 5 .
24. Determine whether a rate or a ratio should be used to relate the quantities in each of the following statements.

- | |
|---|
| (i) The length of a bus and a truck are 10 m and 12 m respectively. |
| (ii) A worker earns \$1000 for 8 hours. |

25.



In the figure above, the volume V of the pyramid is given by $V = \frac{abh}{3}$.

If $a = 3$, $b = 4$ and $h = 5$, find the value of V .

26. Sam used some sticks of the same length to form the following figures:

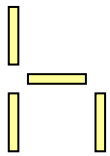


Figure 1

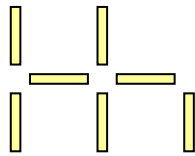


Figure 2

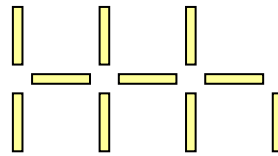


Figure 3

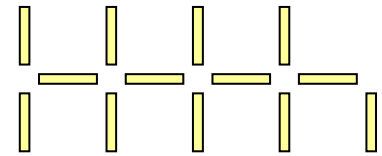


Figure 4

According to the above pattern, how many sticks should Sam use in the 5th figure?

27. The following figures are formed by 2, 4, 6 and 8 squares respectively.



Figure 1

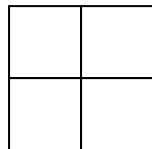


Figure 2

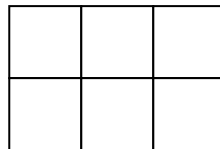


Figure 3

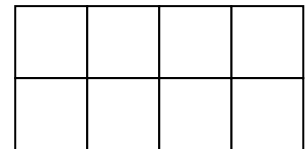
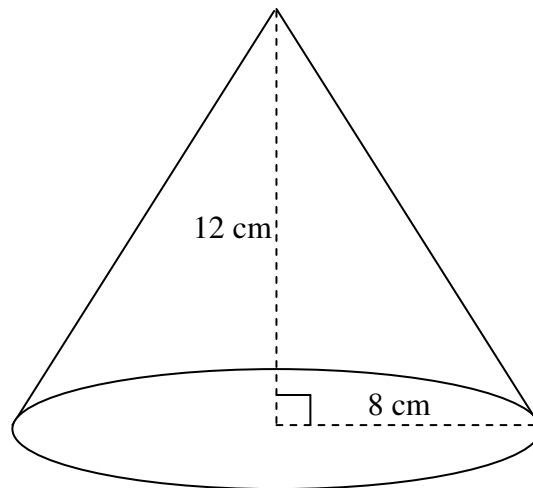


Figure 4

According to the above pattern, how many squares form the n^{th} figure?

28. Find the constant term of the polynomial $2x^3 - 4x^2 - 7$.
29. Expand $-x(7x + 2)$.
30. When $(x+1)(x+2)(x+3)$ is expanded, the result is $x^3 + 6x^2 + 11x + 6$.
What is the result when $x^3 + 6x^2 + 11x + 6$ is factorized?
31. Factorize $x^2 - x - 6$.
32. Factorize $3x^2 + 5x + 2$.
33. 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.)
34. Draw the graph of $x + y = 1$ on the given rectangular coordinate plane in the ANSWER BOOKLET.
35. Simplify $\frac{5x}{2y} + \frac{5x}{3y}$.

36.



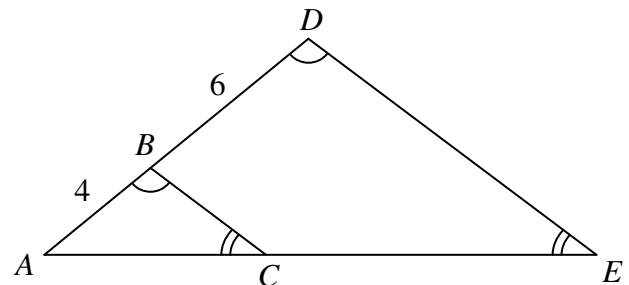
The radius and height of the above right circular cone are 8 cm and 12 cm respectively. Find the volume of the cone in cm^3 (correct to 1 decimal place).

37. Refer to the diagram shown in the ANSWER BOOKLET, add straight lines to the diagram to form the picture of a pyramid with triangular base.

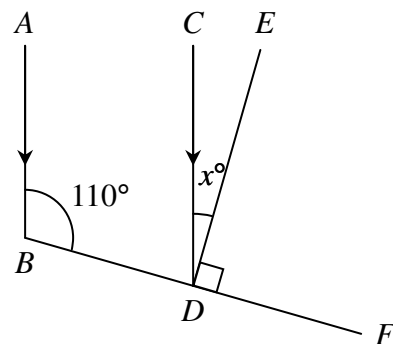
(Hint: Draw two solid lines from point V and one dotted line from point A .)

38. In the figure, $AB = 4$, $BD = 6$,
 $\angle ABC = \angle ADE$ and $\angle ACB = \angle AED$.

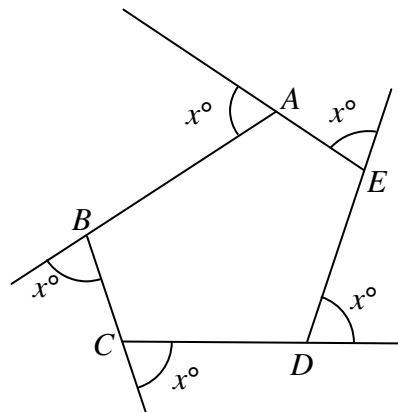
State whether $\triangle ABC$ and $\triangle ADE$ are congruent or similar triangles, and give reason.



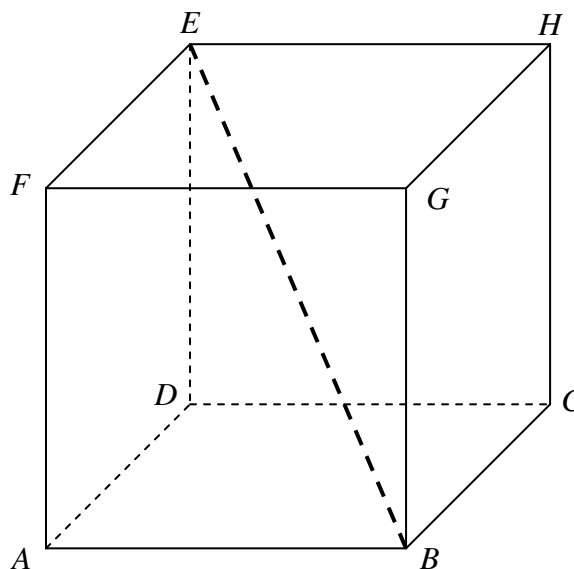
39. In the figure, $AB \parallel CD$ and $\angle EDF = 90^\circ$.
 Find the value of x .



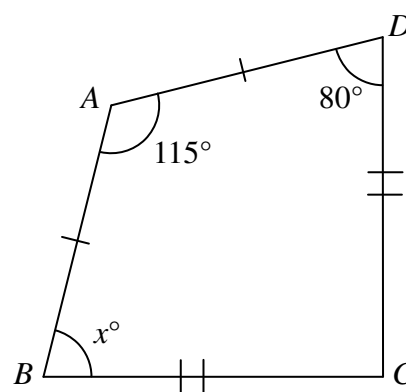
40. In the figure, all exterior angles of pentagon $ABCDE$ are equal to x° . Find the value of x .



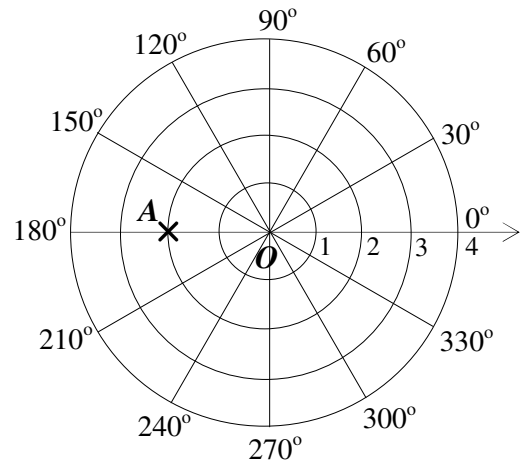
41. In the figure, $ABCDEFGH$ is a cube and BE is a diagonal of the cube. Name the projection of BE on the horizontal plane $ABCD$.



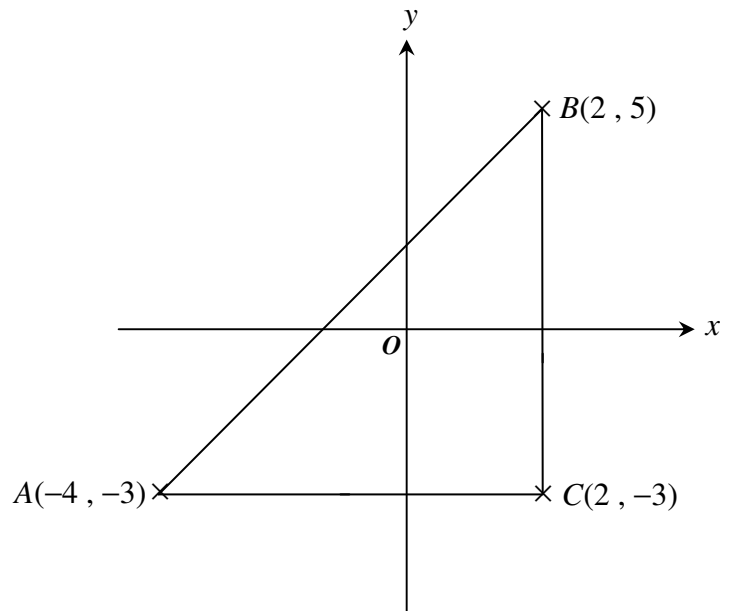
42. In the figure, $ABCD$ is a kite where $AB = DA$ and $BC = CD$. Find the value of x .



43. Find the polar coordinates of point A in the figure.



44. Find the area of $\triangle ABC$ in the figure.



45. A department store is doing a study to analyse the sales of goods. The study is conducted in the following four stages. Arrange these stages. Example: (1) \rightarrow (2) \rightarrow (3) \rightarrow (4)

- (1) Analyse the bar chart to compare the sales of goods.
- (2) Collect sales figures of goods sold by the department store.
- (3) Organize sales figures of different kinds of goods.
- (4) Represent data using a bar chart.

46. The marks of 10 students in a Mathematics test are as follows:

80, 40, 75, 80, 100, 49, 30, 90, 20, 75.

Find the median mark.

47. Sylvia's marks for different papers in Chinese Language examination are as follows:

	Paper 1	Paper 2	Paper 3
Mark	80	60	70
Weight	50%	15%	35%

Find her weighted mean mark in the Chinese Language examination.

48. A fair \$5 coin is tossed three times. Find the probability of getting exactly 2 Heads.

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

49.

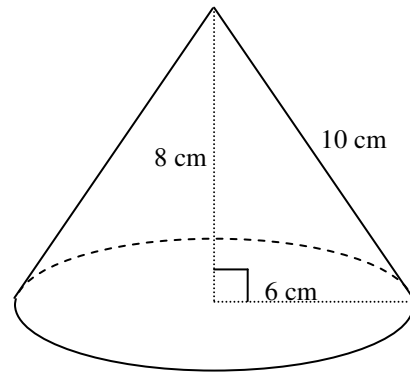
Wisdom College	
Textbook list	
Secondary 3	
<u>Mathematics:</u>	<u>Price</u>
1. Basic Mathematics 3A	\$ 149.3
2. Basic Mathematics 3B	\$ 149.3
3. Basic Mathematics Workbook 3A	\$ 84.0
4. Basic Mathematics Workbook 3B	\$ 84.0
<u>Science:</u>	
5. Fun With Science 3A	\$ 69.0
6. Fun With Science 3B	\$ 69.0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

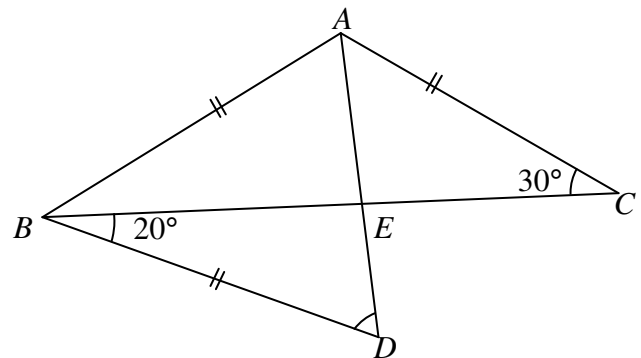
50. Donald deposits \$ 30 000 in a bank for 2 years. The interest rate is 4% p.a. compounded yearly. Find the total interest that Donald will receive.
51. Mr Chan is going to Shanghai for a business trip. He exchanges HK\$ 4000 in the bank for Renminbi (¥). The exchange rate is HK\$ 100 to ¥ 90. Find the amount in Renminbi (¥) he should receive.
52. Given the formula $v^2 = u^2 + 2as$. If $v = 12$, $u = 0$ and $a = 3$, find the value of s .

53. The figure shows a solid cone of base radius 6 cm and height 8 cm. Its slant height is 10 cm.

Find the total surface area of the cone in terms of π .

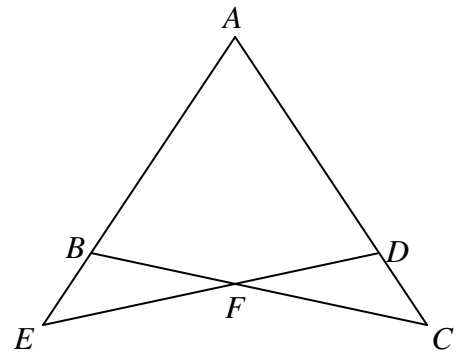


54. In the figure, $\triangle ABC$ and $\triangle BAD$ are isosceles triangles, $AB = AC = BD$. Find $\angle ADB$.



55. In the figure, ABE , ADC , BFC and DFE are straight lines. $AB = AD$ and $AC = AE$.

Prove that $\triangle ABC \cong \triangle ADE$.



56. The times taken in minutes for 20 students to travel from school to home are as follows:

6	26	59	8	39
39	29	7	33	50
23	29	43	35	27
12	55	53	34	58

Complete both frequency distribution tables given in the ANSWER BOOKLET.

END OF PAPER

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