

Education and Manpower Bureau
Territory-wide System Assessment 2007
Secondary 3
Mathematics

Instructions:

1. There are 52 questions in this test.
2. Answer ALL questions.
3. Time allowed is 65 minutes.
4. Use of HKEAA approved calculators is allowed.
5. Write your answers in this Question-Answer booklet.

Section A: Mark your answers by putting a “✓” in the “○”, e.g.:

$$2 + 3 =$$

○ A. 4 ☒ B. 5 ○ C. 6 ○ D. 7

Section B: Write your answers in the spaces provided.

Section C: Write your mathematical expressions, answers and statements/conclusions in the spaces provided.

There is NO need to show your rough work.

6. Do your rough work on the rough work sheet provided.
7. Write your School Code, Class and Class Number in the boxes below.

School Code

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(5)

Class

3	
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Class No.

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(11)

↑
Write one capital letter in this box.

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	$= \pi r^2 h$
Right circular cone	Curved surface area	$= \pi rl$
Circular cone	Volume	$= \frac{1}{3}\pi r^2 h$
Pyramid	Volume	$= \frac{1}{3} \times \text{base area} \times \text{height}$

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

Marker's
Use Only

SECTION A : Mark your answers by putting a “✓” in the “○”.

1. Round off 2.095 327 to 3 significant figures.

☐ A. 2.1 ☐ B. 2.10 ☐ C. 2.09 ☐ D. 2.095

(12)

2. Which of the following algebraic expressions is equivalent to $-2a$?

☐ A. $-2 + a$ ☐ B. $-2 - a$

☐ C. $(-2)(+a)$ ☐ D. $(-2)(-a)$

(13)

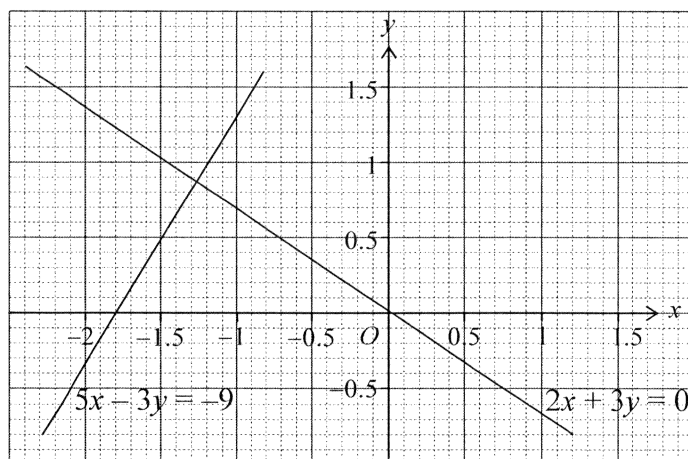
3. Which of the following is a polynomial?

☐ A. $2x - y$ ☐ B. $\frac{2}{x} + y$

☐ C. $\sqrt{x^2 + y^2}$ ☐ D. $\frac{x^2}{y+1}$

(14)

4. Solve graphically $\begin{cases} 2x + 3y = 0 \\ 5x - 3y = -9 \end{cases}$.



☐ A. The approximate solution is $(-1.3, 0.9)$.

☐ B. The approximate solution is $(-1.5, 1)$.

☐ C. The exact solution is $(-1.3, 0.9)$.

☐ D. The exact solution is $(-1.5, 1)$.

(15)

5. Given an equation $3x - c = 0$, where c is a constant.

If the root of the equation is 2, find the value of $6 - c$.

- ☐ A. 0
☐ B. 2
☐ C. 4
☐ D. 6

(16)

6. Which of the following is an identity?

- ☐ A. $5(2 + x) = 5(2 - x)$
☐ B. $5x + 2x = 7x$
☐ C. $5(x + 2) = 5x + 2$
☐ D. $5x + 2 = 7$

(17)

7. If $x \leq y$, which of the following must be correct?

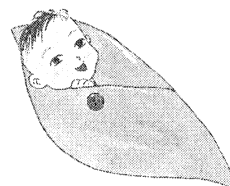
- ☐ A. $x - 3 \geq y - 3$
☐ B. $x + 3 \geq y + 3$
☐ C. $\frac{x}{3} \geq \frac{y}{3}$
☐ D. $-3x \geq -3y$

(18)

8. The body length of a baby is measured to be 50 cm correct to the nearest cm.

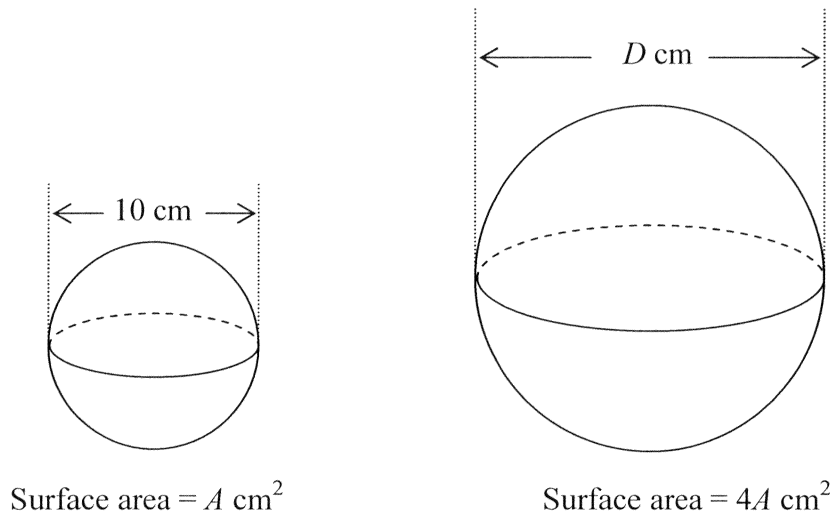
Which of the following is the range of its actual body length?

- ☐ A. 45 cm to 55 cm
☐ B. 49 cm to 51 cm
☐ C. 49.5 cm to 50.5 cm
☐ D. 49.95 cm to 50.05 cm



(19)

9.



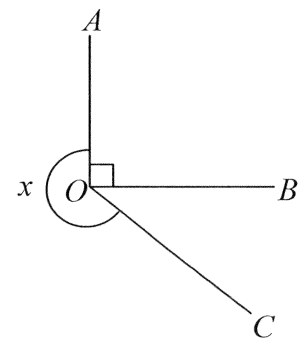
The figure shows two spheres of surface areas $A \text{ cm}^2$ and $4A \text{ cm}^2$ respectively. The diameter of the small sphere is 10 cm and the diameter of the large sphere is D cm. The value of D is

- ☐ A. 20 .
 ☐ B. 40 .
 ☐ C. 80 .
 ☐ D. 160 .

(20)

10. Refer to the figure. AO , BO and CO are straight lines. x is

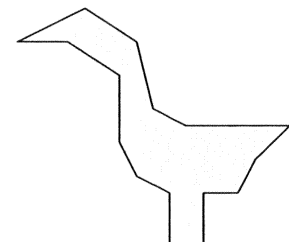
- ☐ A. an acute angle.
 ☐ B. an obtuse angle.
 ☐ C. a reflex angle.
 ☐ D. a straight angle.



(21)

11. What will happen to the size and shape of the figure under reflection?

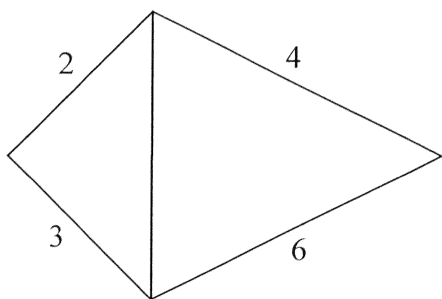
- | <u>Size</u> | <u>Shape</u> |
|--------------------------------------|--------------|
| <input type="radio"/> A. changed | changed |
| <input type="radio"/> B. changed | not changed |
| <input type="radio"/> C. not changed | changed |
| <input type="radio"/> D. not changed | not changed |



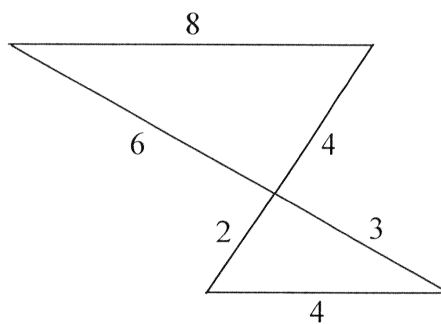
(22)

12. Which of the following figures shows two similar triangles?

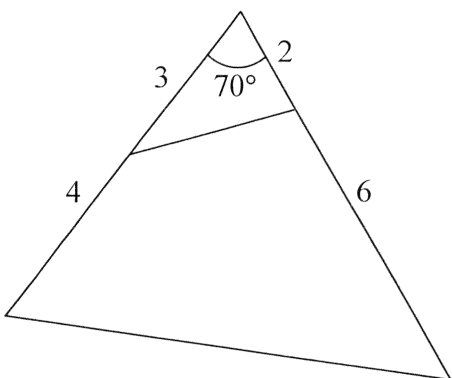
☐ A.



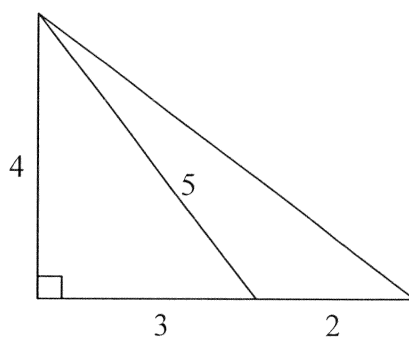
☐ B.



☐ C.



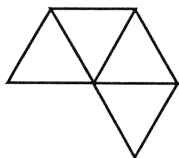
☐ D.



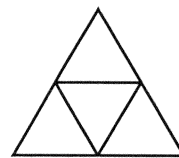
(23)

13. Which of the following nets can be folded into a regular tetrahedron?

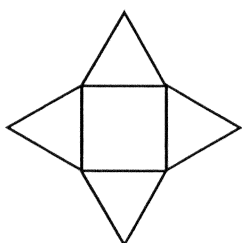
☐ A.



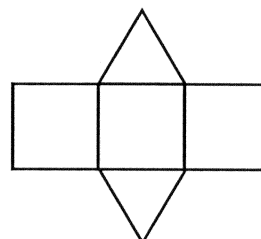
☐ B.



☐ C.



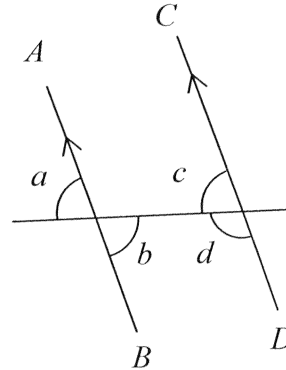
☐ D.



(24)

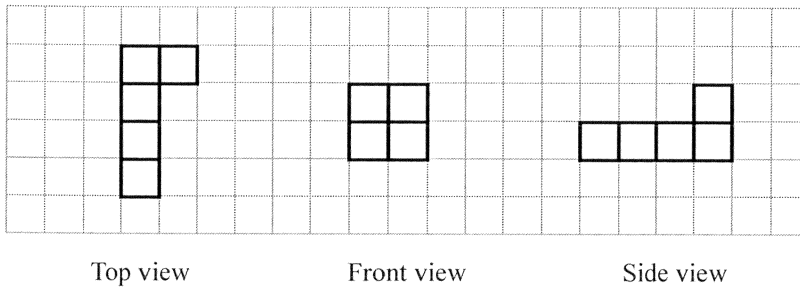
14. In the figure, $AB \parallel CD$. Which of the following are alternate angles?

- ☐ A. a and b
- ☐ B. a and c
- ☐ C. b and c
- ☐ D. b and d



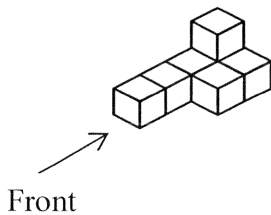
(25)

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

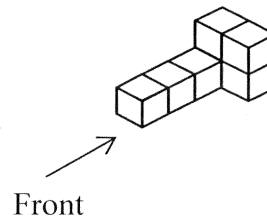


Which of the following is possibly the solid?

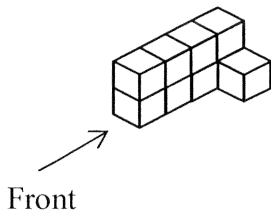
☐ A.



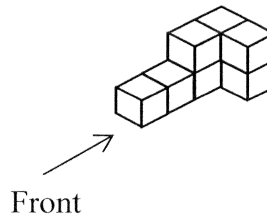
☐ B.



☐ C.

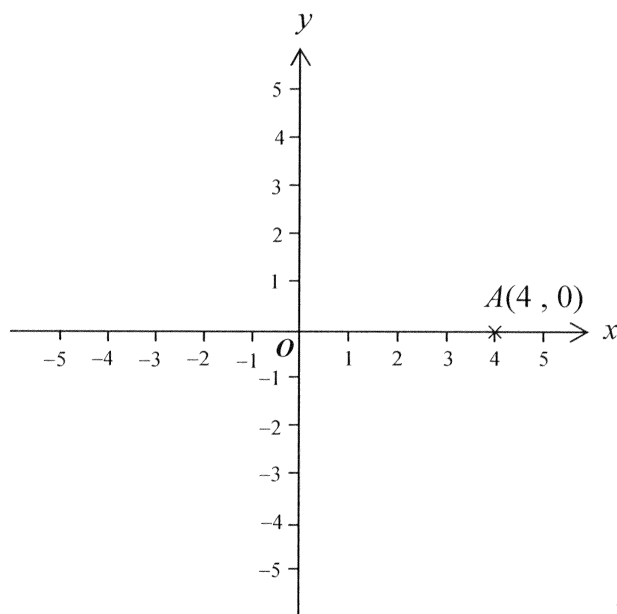


☐ D.



(26)

16.



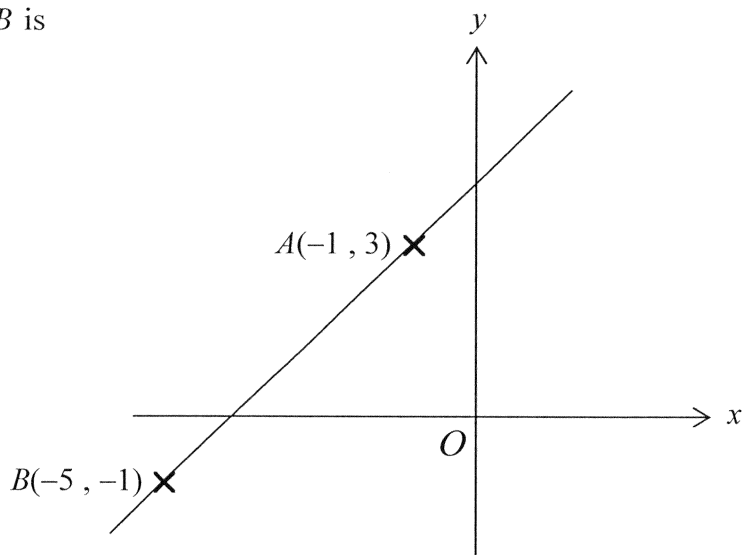
In the figure, point $A(4, 0)$ is rotated clockwise about the origin O through 90° to point A' . The coordinates of A' are

- ☐ A. $(0, 4)$. ☐ B. $(-4, 0)$. ☐ C. $(0, -4)$. ☐ D. $(4, -4)$.

(27)

17. In the figure, the mid-point of AB is

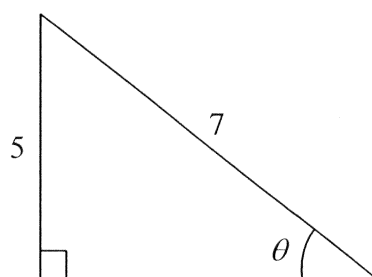
- ☐ A. $(-6, 2)$.
☐ B. $(-3, 1)$.
☐ C. $(-2, -2)$.
☐ D. $(0, 4)$.



(28)

18. In the figure, find θ correct to the nearest degree.

- ☐ A. 36°
☐ B. 44°
☐ C. 46°
☐ D. 54°



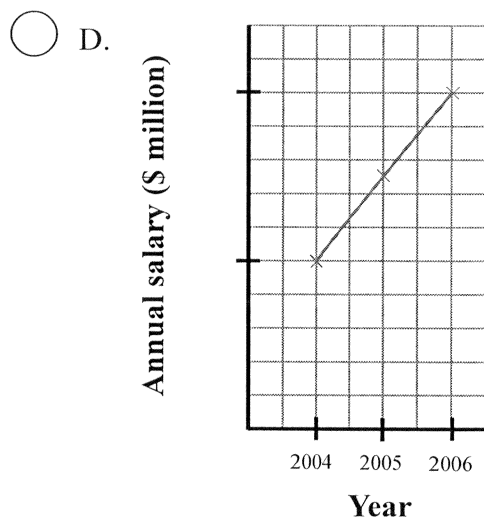
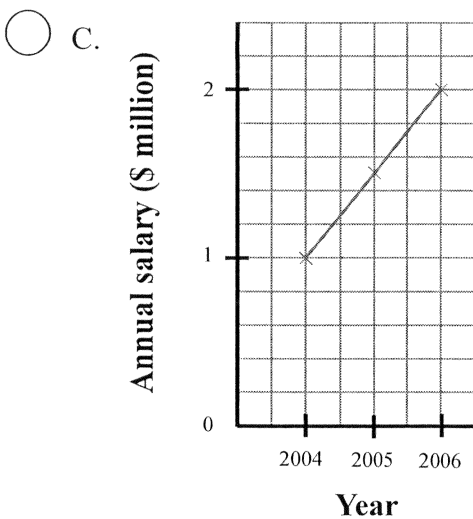
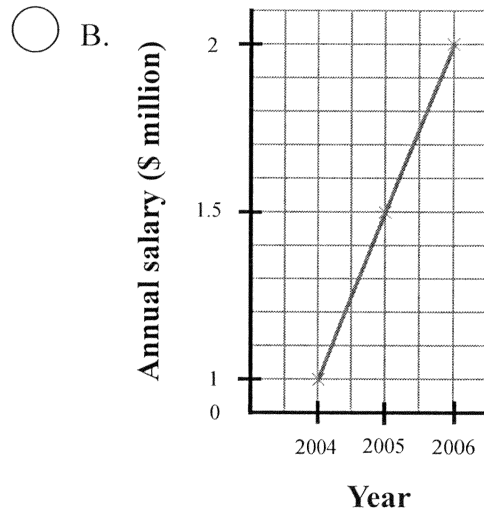
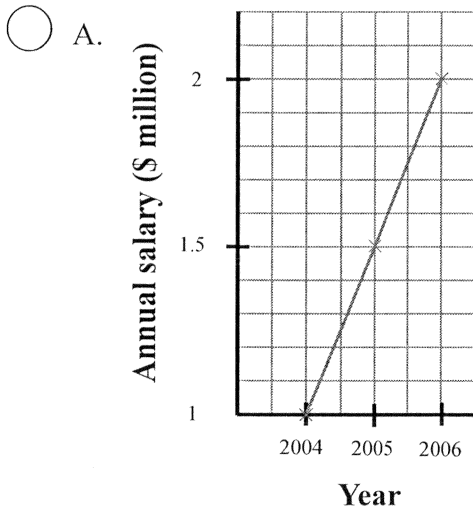
(29)

19. The Consumer Council is studying the safety level of different brands of electric blankets. Which of the following methods of collecting data is most appropriate?

- ☐ A. Collecting newspaper advertisements
- ☐ B. Doing experiments
- ☐ C. Handing out questionnaires
- ☐ D. Observing the behaviour of customers

(30)

20. The following broken line graphs show the annual salaries of the General Manager of Growth Company from 2004 to 2006. Which of the following graphs is most suitable in showing the increase in annual salary of the General Manager?



(31)

SECTION B : Write down your answers in the spaces provided.

21. The security guards of Candy Mall use positive numbers, negative numbers and zero to represent their positions on patrol. For example: +5 stands for five floors above the Ground Floor.

Use suitable numbers to represent the following positions of the guards:

Floor		Answer
Example:	Five floors above the Ground Floor	+5
(i)	Three floors above the Ground Floor	(i) _____
(ii)	Ground Floor	(ii) _____
(iii)	Two floors below the Ground Floor	(iii) _____

1 mark (32)

22. Use scientific notation to represent 120 000.

Answer : 120 000 = _____

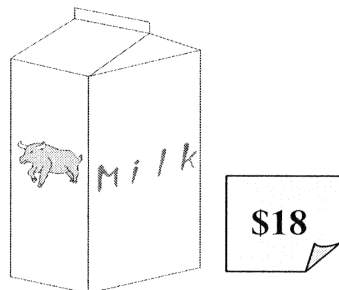
1 mark (33)

23. Determine whether a rate or a ratio should be used to relate the quantities in each of the following statements.

Statement	*Circle the answer
(i) Tom finished a rectangular puzzle of length 16 cm and width 9 cm.	(i)* Rate / Ratio
(ii) Mary bought 5 kg of rice for \$32.5.	(ii)* Rate / Ratio

1 mark (34)


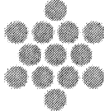
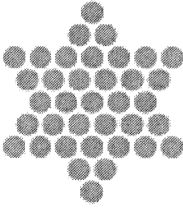
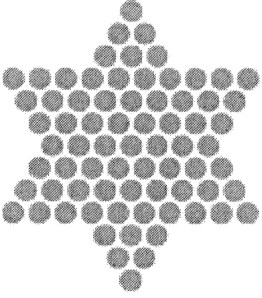
- 24.



In a supermarket, the price of milk is \$18 per box. Mary has given the shop assistant \$100 to pay for x boxes of milk. The shop assistant should return \$ (_____) to Mary.

1 mark (35)

25. The first four figures formed by beads are shown below.

	Figure 1	Figure 2	Figure 3	Figure 4
				
Number of beads	1	13	37	73

The number of beads in the n^{th} figure is $6n(n-1)+1$.

The number of beads in the 10^{th} figure is _____.

1 mark (36)

26. Find the coefficient of x^3 in the polynomial $-7 - 4x^2 + x^3$.

Answer : _____

1 mark (37)

27. Simplify $(9xy - 2y) - (5xy + y)$.

Answer : $(9xy - 2y) - (5xy + y) =$ _____

1 mark (38)

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

Answer : $\frac{(x^4)^2}{x^2} =$ _____

1 mark (39)

29. Factorize $9x^2 + 6x + 1$.

Answer : $9x^2 + 6x + 1 =$ _____

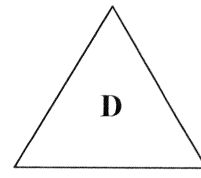
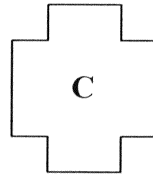
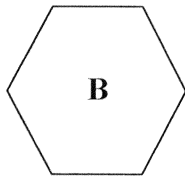
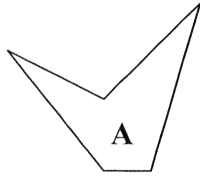
1 mark (40)

30. Solve $2x - 6x = 8$.

Answer : $x =$ _____

1 mark (41)

31. Which of the following are concave polygons?
(There may be more than one answer.)

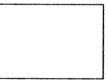
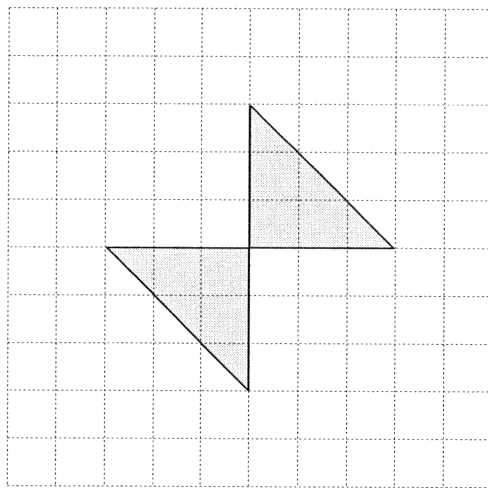


Answer: _____



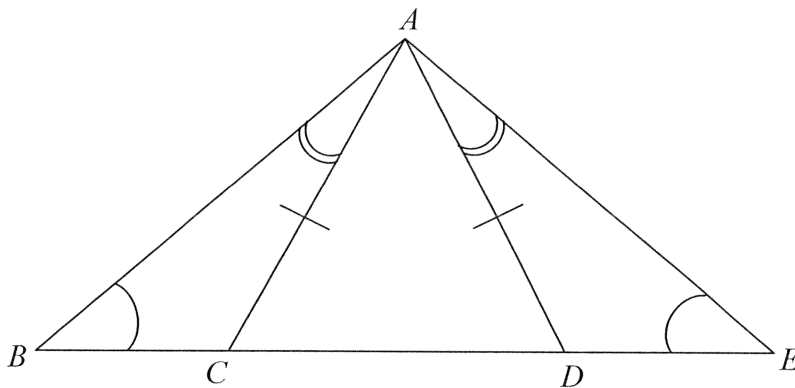
1 mark (42)

32. Draw all axes of symmetry of the following figure.



1 mark (43)

- 33.

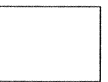


In the above figure, $AC = AD$, $\angle ABC = \angle AED$ and $\angle BAC = \angle DAE$. State whether $\triangle ABC$ and $\triangle ADE$ are congruent or similar triangles, and give reason.

(*Circle the answers)

Answers : $\triangle ABC$ and $\triangle ADE$ are * congruent / similar triangles .

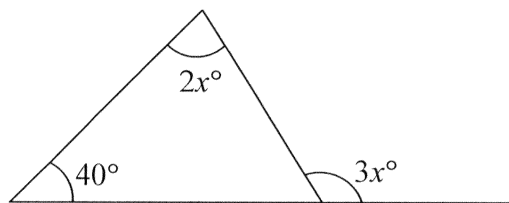
The reason is * AAA / AAS / SAS / ratio of 2 sides, inc. \angle .



1 mark (44)

34. Refer to the figure. Find the value of x .

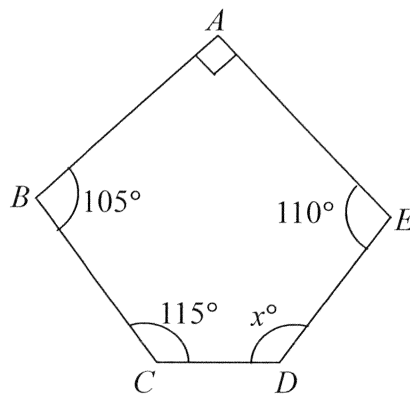
Answer : $x =$ _____



1 mark (45)

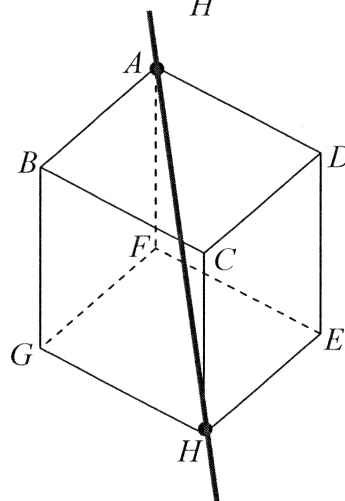
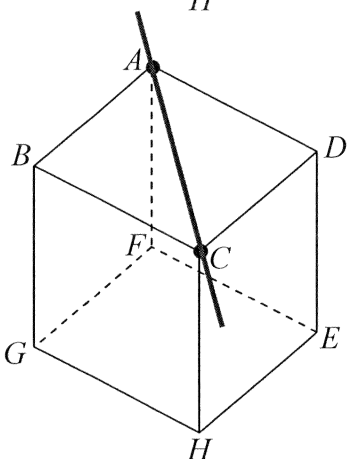
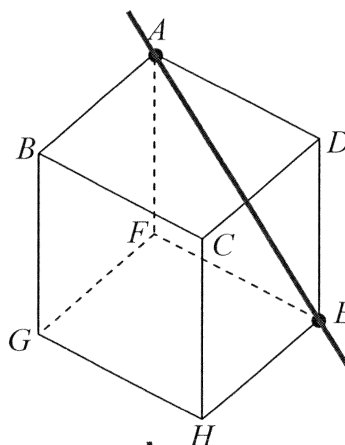
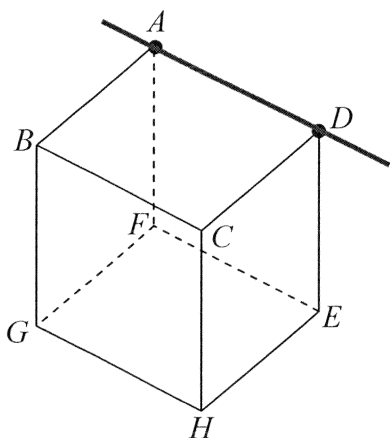
35. The figure shows a pentagon $ABCDE$. Find the value of x .

Answer : $x =$ _____



1 mark (46)

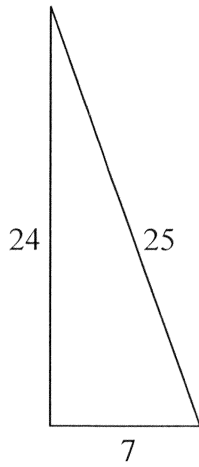
36. In the figures below, which bold line is an axis of rotational symmetry of the cube?



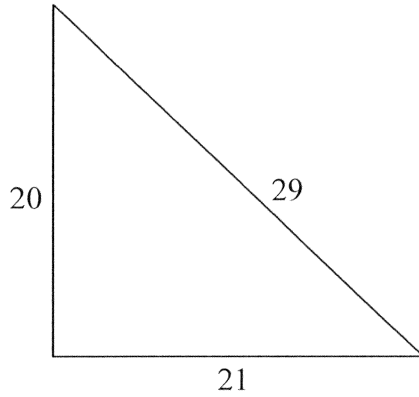
Answer : _____

1 mark (47)

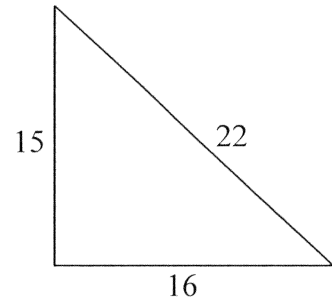
37. Which of the following triangles are right-angled?
(There may be more than one answer.)



Triangle A



Triangle B

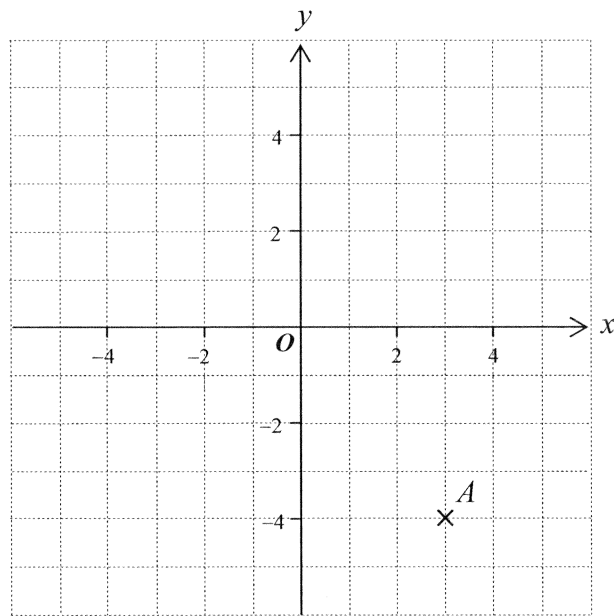


Triangle C

Answer : _____

1 mark (48)

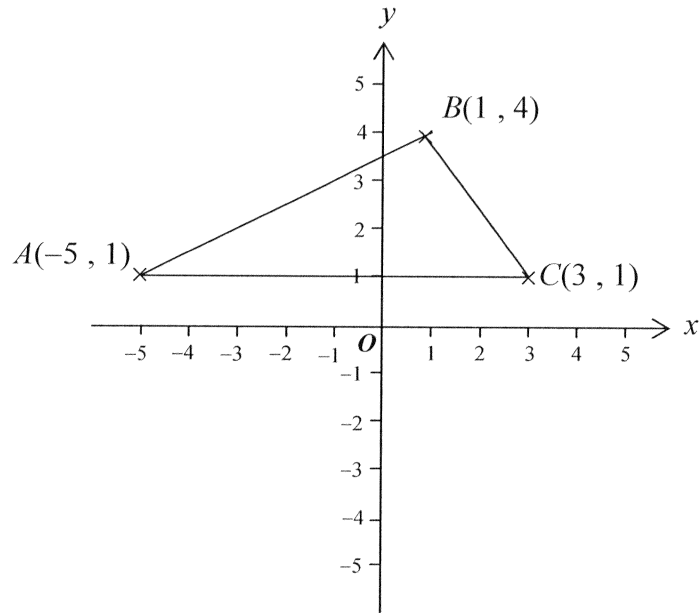
38.



In the above rectangular coordinate plane, the coordinates
of A are (_____ , _____).

1 mark (49)

39.



The area of $\triangle ABC$ is _____ square units.

1 mark (50)

40. Given $\sin \theta = \frac{4}{7}$.

Find θ correct to the nearest 0.1° .

Answer : $\theta =$ _____^o

1 mark (51)

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

Data	*Circle the answer
(i) The thickness of a pile of paper.	(i) * Discrete / Continuous
(ii) The number of pages of a book.	(ii) * Discrete / Continuous

1 mark (52)

42.

Marks	Frequency
1 – 5	1
6 – 10	3
11 – 15	4
16 – 20	2

The above frequency distribution table shows the results of 10 students in a mathematics quiz.

The mean mark is _____ .

1 mark (53)

43. The admission test of Mathematics School consists of three papers: Chinese, English and Mathematics. The table below shows the weight of each paper and Peter's marks.

Paper	Chinese	English	Mathematics
Weight	3	3	4
Mark	80	70	90

Peter's weighted mean mark is _____ .

1 mark (54)

44. Kelly has put 25 coupons into a box. The face values of the coupons are as follows:

Face value	\$50	\$10	\$5
Number of coupons	7	5	13

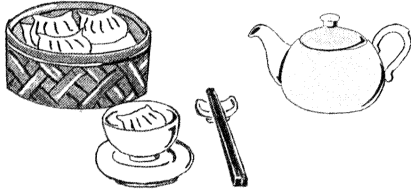
Alan randomly draws a coupon from the box. Find the probability that the face value of the drawn coupon is less than \$50.

Answer : The probability is _____ .

1 mark (55)

SECTION C: Write your mathematical expressions, answers and statements/conclusions in the spaces provided.
There is NO need to show your rough work.

45.



Tea	\$5 per person
<u>Price per dish</u>	
Large dish	\$19.7
Medium dish	\$14.8
Small dish	\$9.8

Mr and Mrs Chan had breakfast in a restaurant which served large, medium and small dishes. They ordered 3 large dishes, 2 medium dishes and 1 small dish. Each person was charged \$5 for tea.

Estimate the total amount that they had to pay for the tea and the dishes. Explain your method of estimation.

1 mark (56)

1 mark (57)

46. Tom deposits \$50 000 in a bank. The interest rate is 4% p.a. compounded yearly. Find the amount that Tom will receive after 2 years.

(Show your working)

1 mark (58)

1 mark (59)

1 mark (60)

47. Given a formula $S = \frac{a}{1-r}$.

- (a) Make r the subject of the formula.
(Show your working)

1 mark (61)

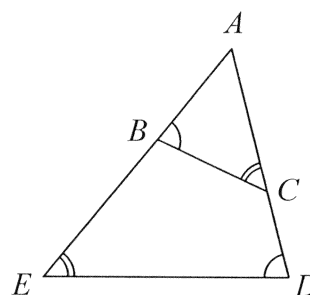
- (b) If $S = 6$ and $a = 9$, find the value of r .
(Show your working)

1 mark (62)

1 mark (63)

48. In the figure, ABE and ACD are straight lines.
 $\angle ABC = \angle ADE$ and $\angle ACB = \angle AED$.

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



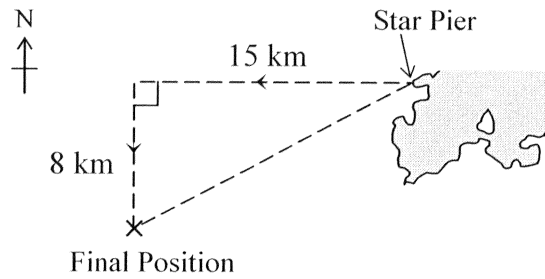
(Proof)

1 mark (64)

1 mark (65)

1 mark (66)

49. A boat sailed 15 km due West and then 8 km due South. Find the distance between the final position of the boat and Star Pier.



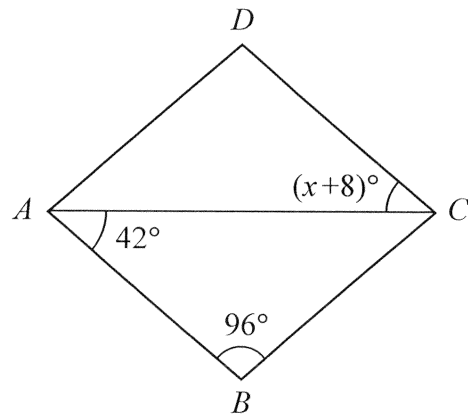
(Show your working)

1 mark (67)

1 mark (68)

1 mark (69)

50. $ABCD$ is a rhombus. Find the value of x .

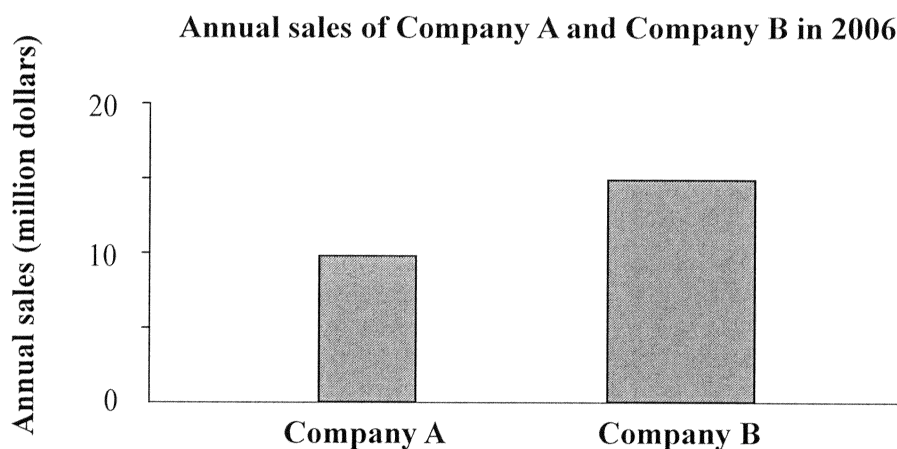


(Show your working)

1 mark (70)

1 mark (71)

51. The following diagram shows the annual sales of Company A and Company B in 2006.



- (a) What was the difference in annual sales of Company A and Company B in 2006?

Answer : The difference in annual sales was _____ million dollars.

- (b) Explain why the diagram is misleading.

1 mark (72)

1 mark (73)

52. Five athletes finished a 100 m race in 9.78 s, 9.79 s, 9.83 s, 9.84 s and 9.86 s respectively. Find the mean time to finish the race.



(Show your working)

1 mark (74)

1 mark (75)

1 mark (76)

END OF PAPER