

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

Instructions:

1. There are 51 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. $9 \times 10^{-6} =$

☐ A. 900 000

☐ B. 9 000 000

☐ C. 0.000 009

☐ D. 0.000 000 9

(12)

2. Which of the following is correct?

☐ A. $2^m \times 2^n = 4^{m+n}$

☐ B. $\frac{2^m}{2^n} = \frac{m}{n}$

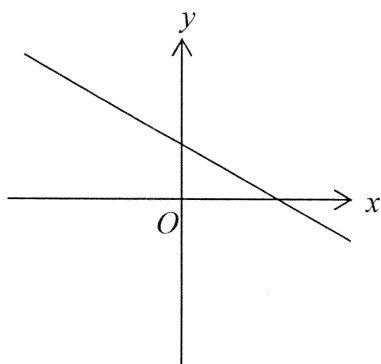
☐ C. $(2^m)^n = 2^{mn}$

☐ D. $2^m \times 2^n = 4^{mn}$

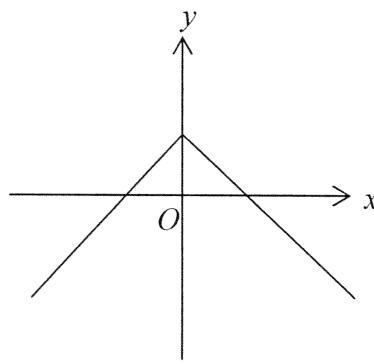
(13)

3. Which of the following can be the graph of the equation $3x + 4y - 12 = 0$?

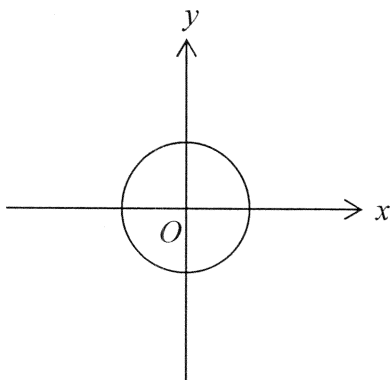
☐ A.



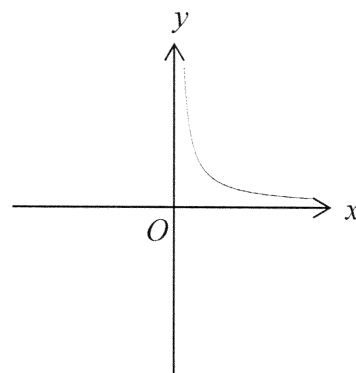
☐ B.



☐ C.

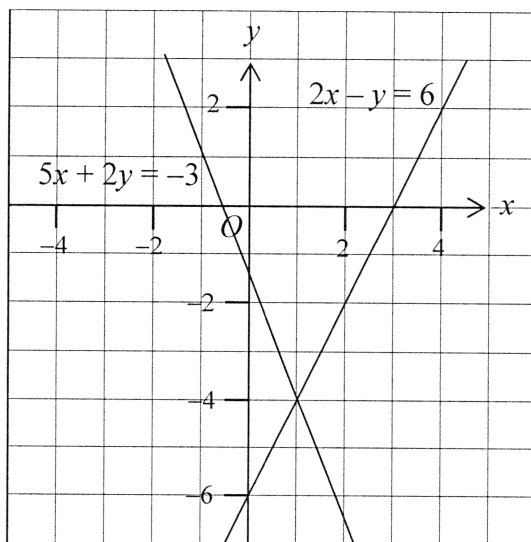


☐ D.



(14)

4.



Solve graphically $\begin{cases} 5x + 2y = -3 \\ 2x - y = 6 \end{cases}$.

☐ A. (3, 0)

☐ B. (1, -4)

☐ C. (0, -6)

☐ D. (-4, 1)

(15)

5. Which of the following diagrams represents $x \geq 2$?

☐ A.

☐ B.

☐ C.

☐ D.

(16)

6. In which of the following health reports is the weight of a patient expressed in the most appropriate unit and degree of accuracy?

☐ A.

Health Report
Weight : 62 500 g
Height : 170 cm

☐ B.

Health Report
Weight : 62 543 g
Height : 170 cm

☐ C.

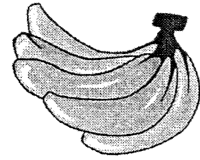
Health Report
Weight : 62.5 kg
Height : 170 cm

☐ D.

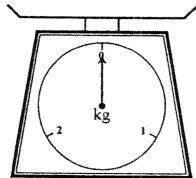
Health Report
Weight : 62.543 kg
Height : 170 cm

(17)

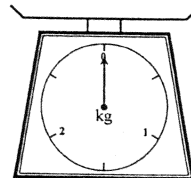
7. Which of the following balances measures the weight of bananas with the smallest error?



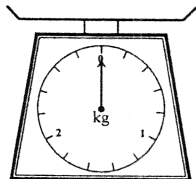
☐ A.



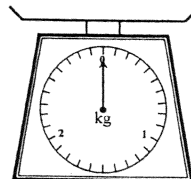
☐ B.



☐ C.



☐ D.



(18)

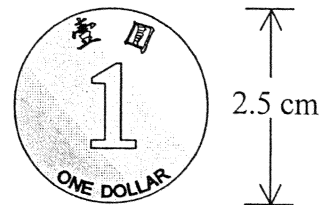
8. The diameter of a \$1 coin is 2.5 cm. Find the area of the coin.

☐ A. $1.5625\pi \text{ cm}^2$

☐ B. $2.5\pi \text{ cm}^2$

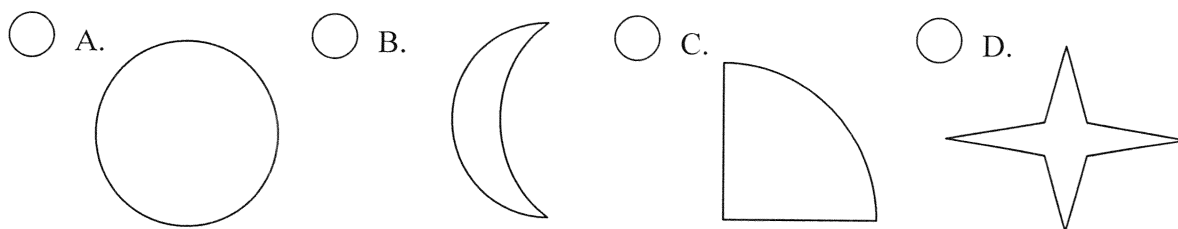
☐ C. $5\pi \text{ cm}^2$

☐ D. $6.25\pi \text{ cm}^2$



(19)

9. Which of the following figures is a polygon?



(20)

10.

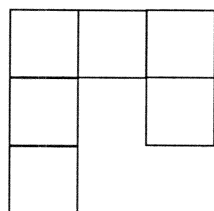


Figure 1

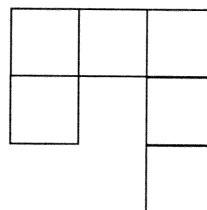


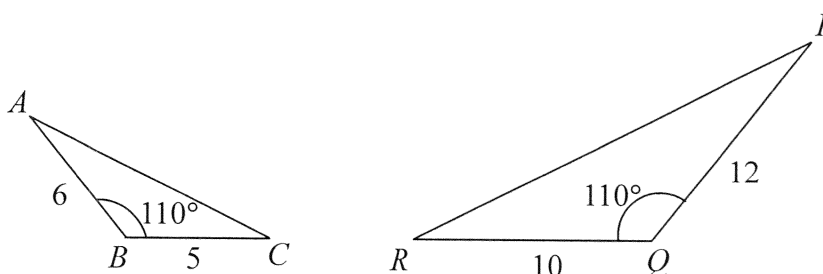
Figure 2

Which single transformation will change Figure 1 to Figure 2?

- ☐ A. rotation
 ☐ B. reflection
 ☐ C. translation
 ☐ D. enlargement

(21)

11.



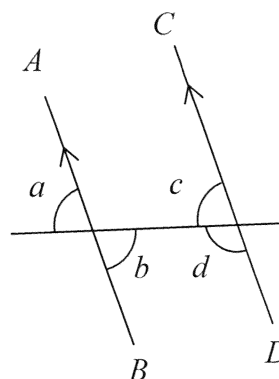
Refer to $\triangle ABC$ and $\triangle PQR$. Which of the following is correct?

- ☐ A. $\triangle ABC \cong \triangle PQR$ (ASA)
☐ B. $\triangle ABC \cong \triangle PQR$ (SAS)
☐ C. $\triangle ABC \sim \triangle PQR$ (3 sides proportional)
☐ D. $\triangle ABC \sim \triangle PQR$ (ratio of 2 sides, inc. \angle)

(22)

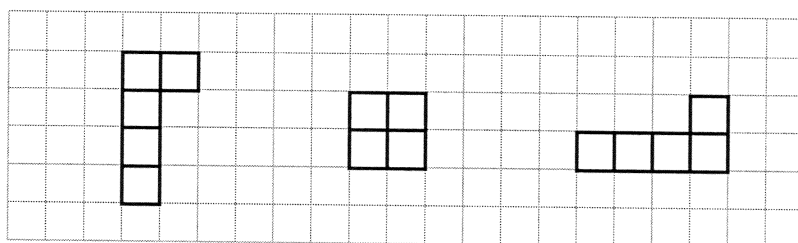
12. In the figure, $AB \parallel CD$. Which of the following are alternate angles?

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



(23)

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



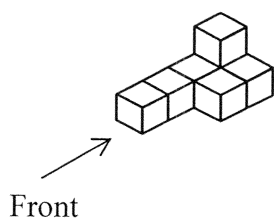
Top view

Front view

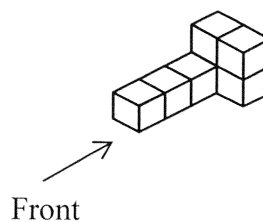
Side view

Which of the following is possibly the solid?

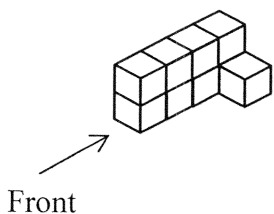
☐ A.



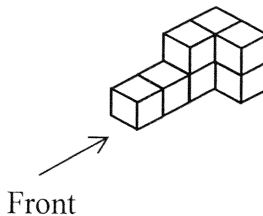
☐ B.



☐ C.

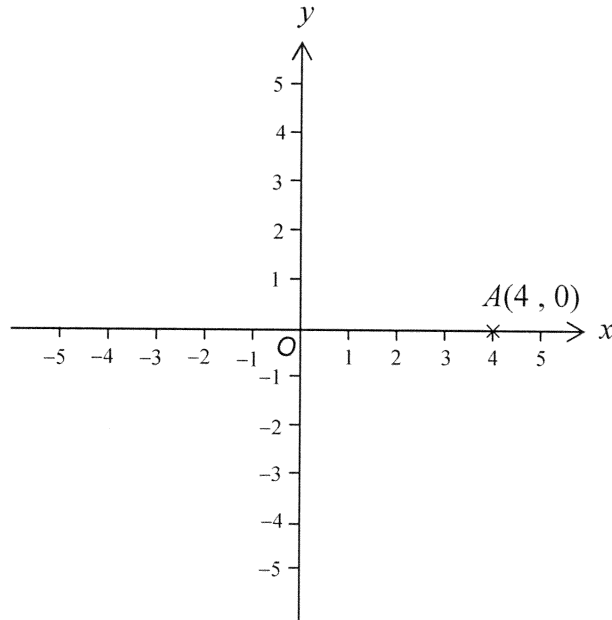


☐ D.



(24)

14.



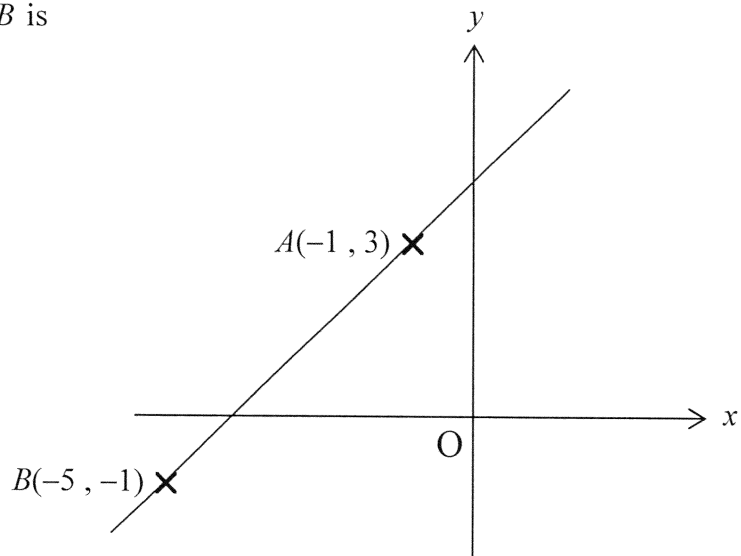
In the figure, point $A(4, 0)$ is rotated clockwise about the origin O through 90° to point A' . The coordinates of A' are

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

(25)

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

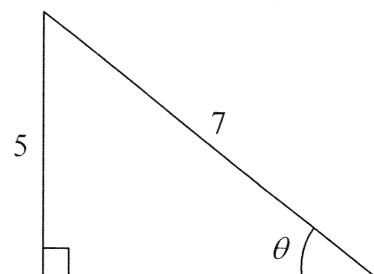
- ☐ A. $(-6, 2)$.
☐ B. $(-3, 1)$.
☐ C. $(-2, -2)$.
☐ D. $(0, 4)$.



(26)

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

- ☐ A. 36°
☐ B. 44°
☐ C. 46°
☐ D. 54°



(27)

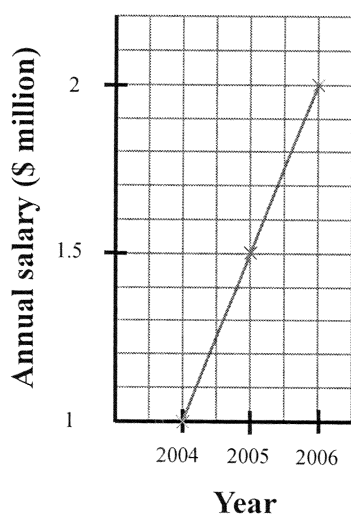
17. The Consumer Council is studying the safety level of different brands of electric blankets. Which of the following methods of collecting data is most appropriate?

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

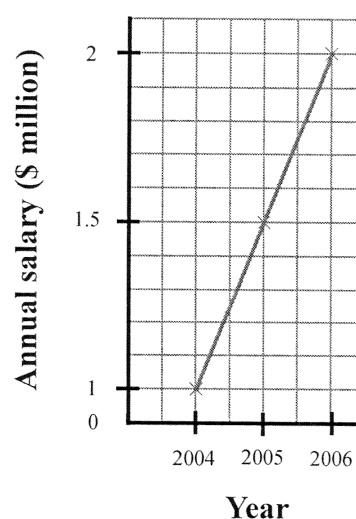
(28)

18. 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?

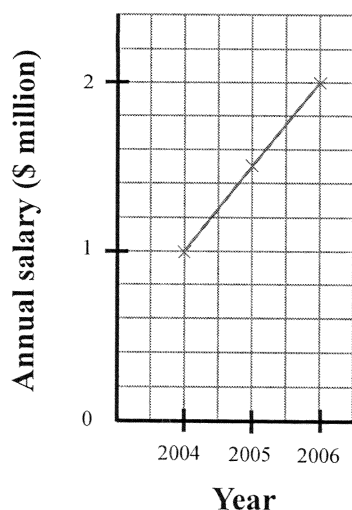
☐ A.



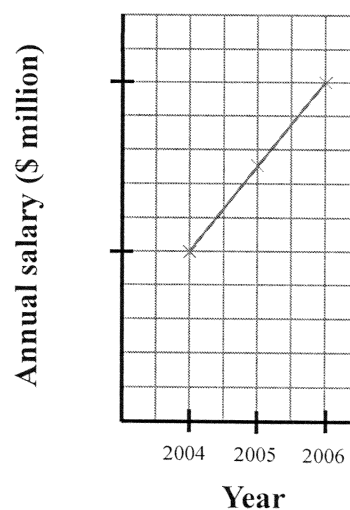
☐ B.



☐ C.



☐ D.



(29)

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

19. Evaluate $\frac{-7-11}{2}$.

Answer : _____

1 mark (30)

20.

Mother's Bank

Attractive Return

Deposit \$1 000 for 2 years

and get an interest of \$120

**Simple interest will be paid at the end of 2-year period*

The above notice is posted in Mary's bedroom.

The interest rate per annum offered by her mother is _____ %.

1 mark (31)

21. The monthly salary of John is \$10 000. Each month he spends \$7 000 and saves the remaining money in the bank. Find the ratio of John's monthly salary to his monthly savings.

Answer : The ratio is _____ : _____ .

1 mark (32)

22. Mary uses 200 g of cheese and some flour to make a cheesecake. The ratio of the weight of cheese to the weight of flour is 5 : 2. What is the weight of flour?

Answer : The weight of flour is _____ g.

1 mark (33)

23. A cashbox contains x \$2 coins and y \$5 coins. The total amount of the coins is \$100. Write an equation relating x and y .

Equation : _____

1 mark (34)

24. The following figures are formed by 1, 4, 9 and 16 squares respectively.



Figure 1



Figure 2

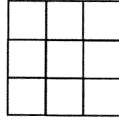


Figure 3

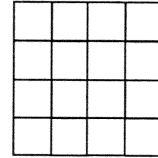
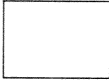


Figure 4

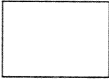
According to the above pattern, the n^{th} figure is formed by _____ squares.



1 mark (35)

25. Arrange the terms of the polynomial $x + x^4 - 5 - 2x^3$ in descending powers of x .

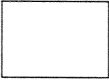
Answer : _____



1 mark (36)

26. Expand $2x(-3xy)$.

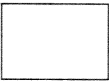
Answer : $2x(-3xy) =$ _____



1 mark (37)

27. Factorize $1 - 4x^2$.

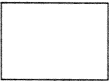
Answer : $1 - 4x^2 =$ _____



1 mark (38)

28. Factorize $x^2 + 3x - 10$.

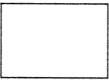
Answer : $x^2 + 3x - 10 =$ _____



1 mark (39)

29. Solve $\frac{6x+5}{2} = x$.

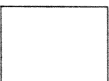
Answer : $x =$ _____



1 mark (40)

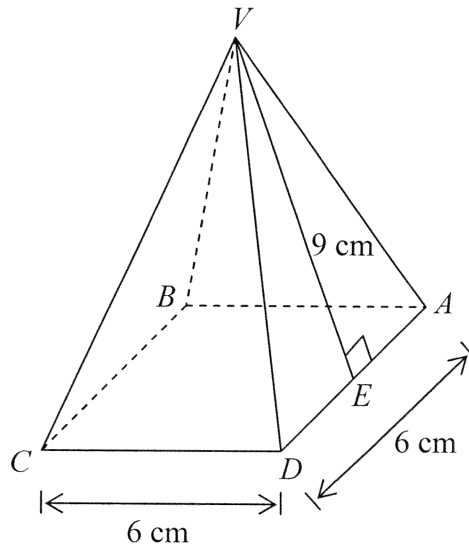
30. Solve the inequality $-2x + 3 > 5$.

Answer : _____

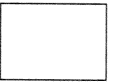


1 mark (41)

31.

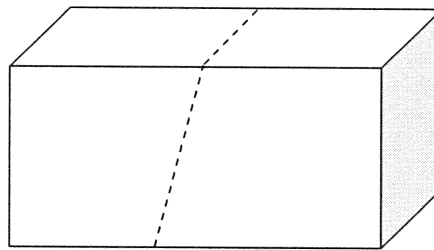


$VABCD$ is a solid right pyramid. The base $ABCD$ is a square of length 6 cm. The height of each lateral face is 9 cm. The surface area of the pyramid is _____ cm^2 .

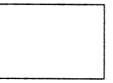


1 mark (42)

32. Sketch the cross-section when the following cuboid is cut along the dotted line.

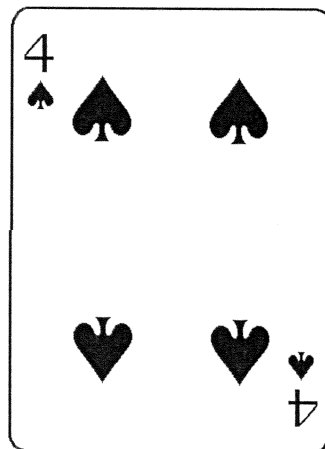


Cross-section : _____

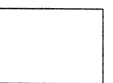


1 mark (43)

33.

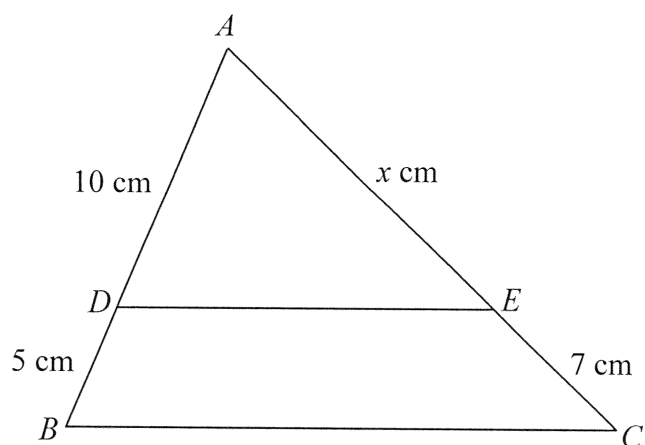


The above figure has rotational symmetry. The order of rotational symmetry is _____ .



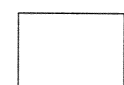
1 mark (44)

34.



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

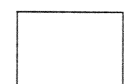
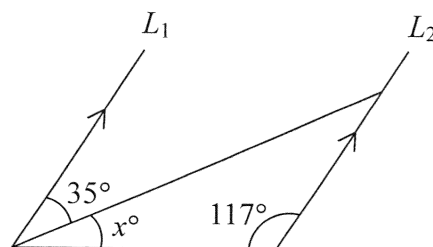
Answer : $x =$ _____



1 mark (45)

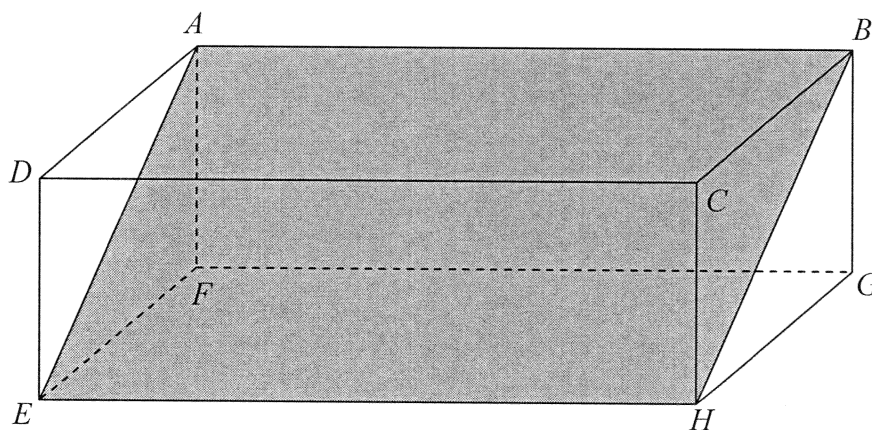
35. In the figure, $L_1 \parallel L_2$. Find the value of x .

Answer : $x =$ _____



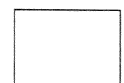
1 mark (46)

36.



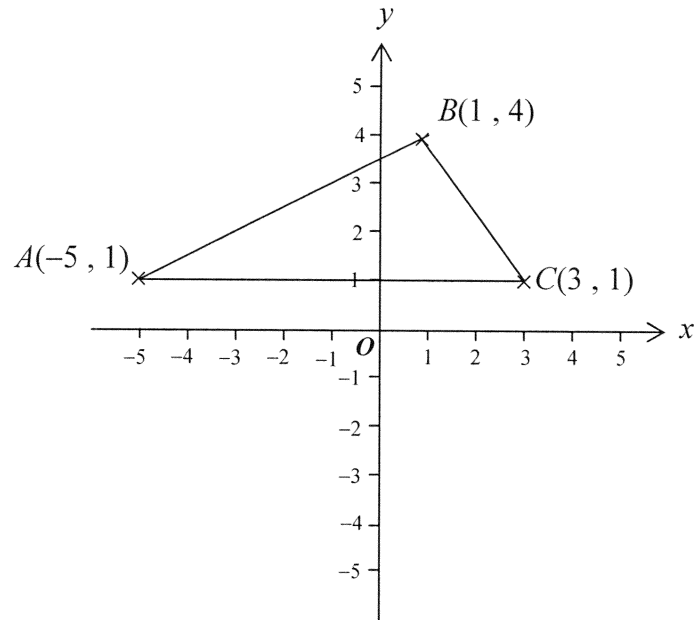
In the figure, $ABCDEFGH$ is a cuboid. Name the angle between the inclined plane $ABHE$ and the horizontal plane $EFGH$.

Answer : _____



1 mark (47)

37.



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

1 mark (48)

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

Find θ correct to the nearest 0.1° .

Answer : $\theta =$ _____^o

1 mark (49)

39. 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 (50)

40.

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 (51)

41. 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 (52)

42. 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

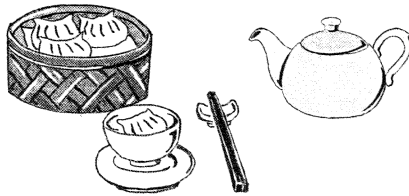
Alan randomly draws a coupon from the box. Find the probability that the face value of the drawn coupon is less than \$50.

Answer : The probability is _____ .

1 mark (53)

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

43.



Tea \$5 per person

Price per dish

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 (54)

1 mark (55)

44. 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 (56)

1 mark (57)

1 mark (58)

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

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

1 mark (59)

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

1 mark (60)

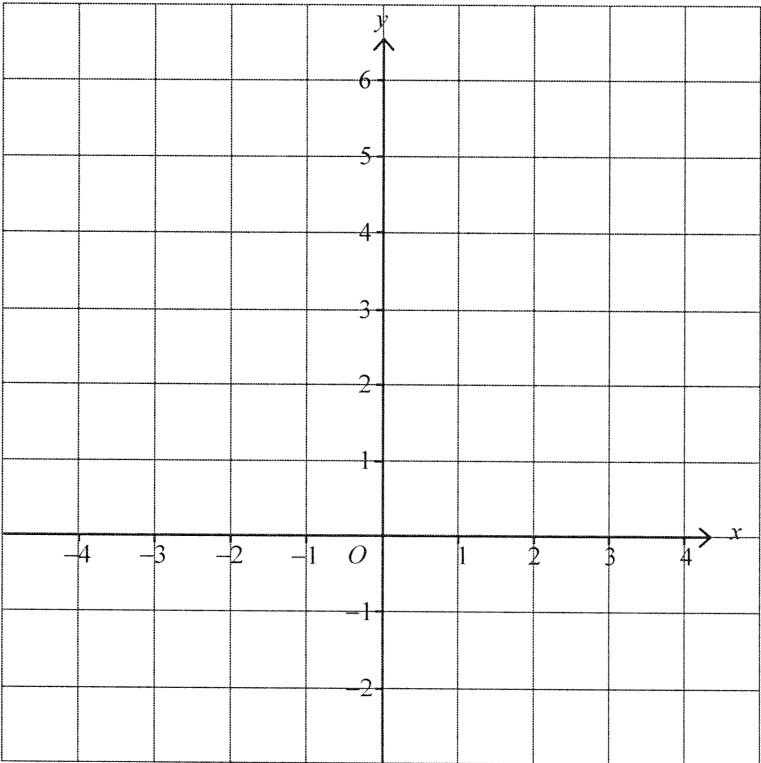
1 mark (61)

46. Given that $x + 3y = 6$.

Complete the following table and draw the graph of $x + 3y = 6$ on the given rectangular coordinate plane.

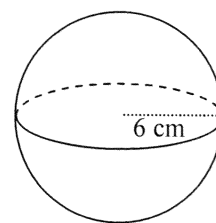
x	-3	0	3
y		2	

1 mark (62)



1 mark (63)

47. The figure shows a solid sphere of radius 6 cm.
Find, in terms of π , the volume of the sphere.



(Show your working)

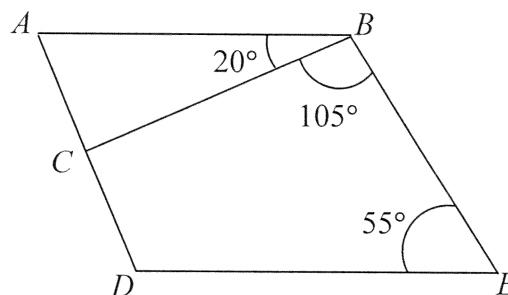
1 mark (64)

1 mark (65)

1 mark (66)

48. In the figure, $\angle ABC = 20^\circ$, $\angle CBE = 105^\circ$ and $\angle BED = 55^\circ$.

Prove that $AB \parallel DE$.

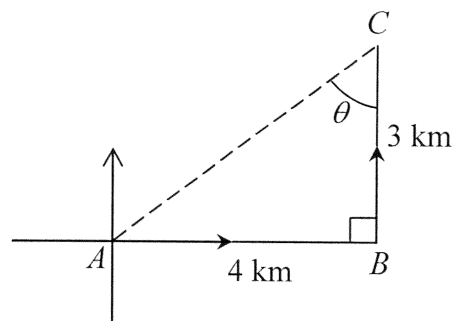


(Proof)

1 mark (67)

1 mark (68)

49. In the figure, a speedboat left Pier A and sailed 4 km due east to B . It then sailed 3 km due north to reach C .



- (a) Find θ correct to the nearest degree.
(Show your working)

- (b) Find the compass bearing of C from A correct to the nearest degree.

Answer : The compass bearing of C from A is _____.

1 mark (69)

1 mark (70)

1 mark (71)

1 mark (72)

50. The following table shows the distribution of the monthly salaries of 15 employees in a company.

Position	Manager	Officer	Clerk	Office Assistant
Salary (\$)	55 000	10 000	7 500	5 000
Number of employees	1	2	6	6

The manager of the company claims that the average monthly salary of the employees is relatively high. Do you agree with the manager? Explain your answer.

Average monthly salary

$$= \frac{\$(55\,000 + 10\,000 \times 2 + 7\,500 \times 6 + 5\,000 \times 6)}{15}$$

= \$10 000



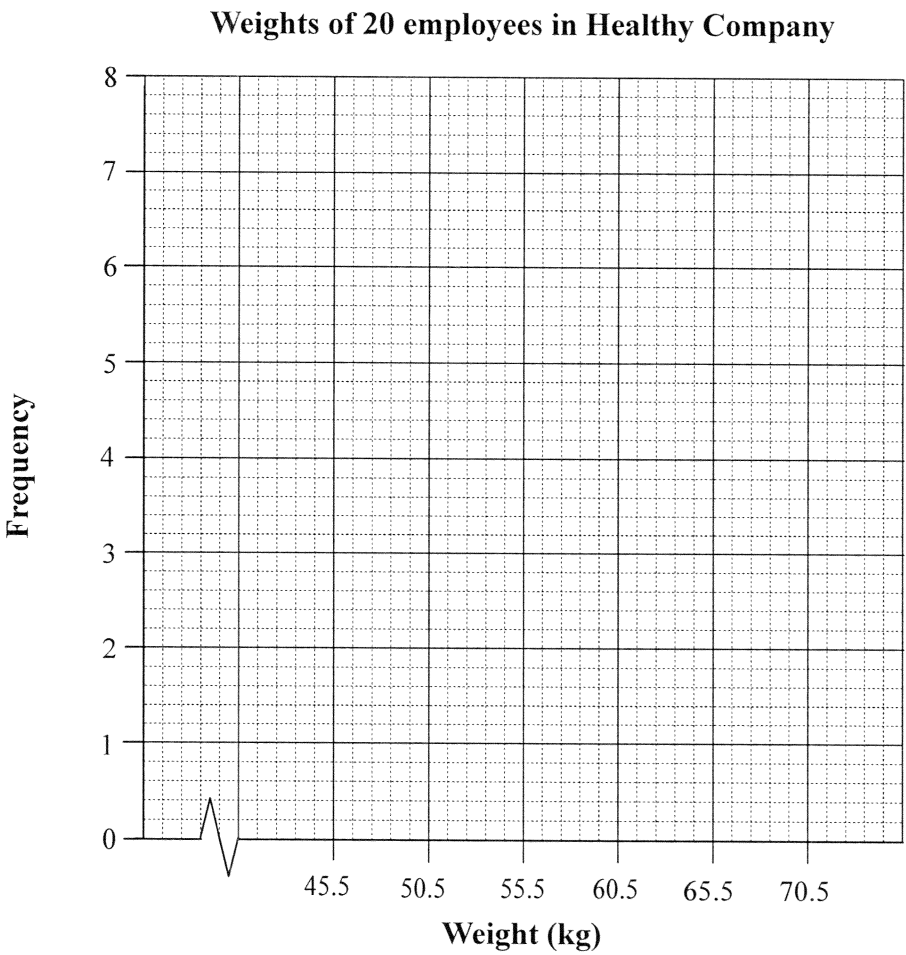
1 mark (73)

1 mark (74)

51. The following frequency distribution table shows the weights of 20 employees in Healthy Company.

Weight (kg)	Frequency
46 – 50	2
51 – 55	4
56 – 60	6
61 – 65	5
66 – 70	3

Draw a histogram to represent the data.



1 mark (75)

1 mark (76)

END OF PAPER