9	M	E	2

(1)

Education and Manpower Bureau
Territory-wide System Assessment 2006
Secondary 3
Mathematics

Instructions:

1. There are 52 questions in this test.
2. Answer ALL questions.
3. The time allowed is 65 minutes.
4. Use of HKEAA approved calculators is allowed.
5. Write your answers in this question 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 spaces below.

School Code | | | | (5) **Class** | 3 | | ↑ Write one capital letter in this box. **Class No.** | | | (11)

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	$= \frac{1}{3} \times$ base area $\times$ 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 0.073 648 to 3 significant figures.

◯ A. 0.07 ◯ B. 0.074 ◯ C. 0.073 6 ◯ D. 0.073 65 (12)

2. If $36 : 15 : x = y : 5 : 9$, find the values of x and y.

◯ A. $x = 3, \quad y = 12$ ◯ B. $x = 3, \quad y = 108$

◯ C. $x = 27, \quad y = 12$ ◯ D. $x = 27, \quad y = 108$ (13)

3. Which of the following is a polynomial?

◯ A. $\dfrac{1}{x+y}$ ◯ B. $x^3 + y$

◯ C. $\dfrac{x}{y} + 1$ ◯ D. $3^x + y$ (14)

4. The root of the equation $2x - 8 = 0$ is

◯ A. 1. ◯ B. 2. ◯ C. 4. ◯ D. 8. (15)

5. A cashbox contains one \$10 coin and x \$2 coins. The total amount of the coins is greater than or equal to \$50. Which of the following inequalities can be used to find the range of x ?

◯ A. $10x + 2 > 50$ ◯ B. $10x + 2 \geq 50$

◯ C. $10 + 2x > 50$ ◯ D. $10 + 2x \geq 50$ (16)

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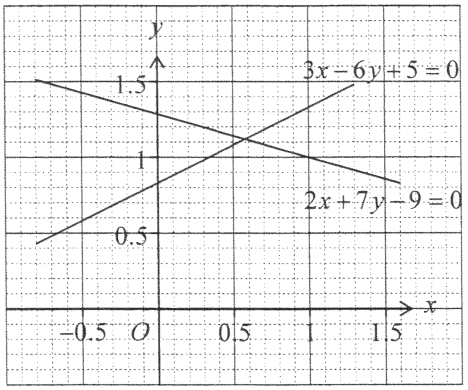
Marker's Use Only

6. Solve graphically $\begin{cases} 3x-6y+5=0 \\ 2x+7y-9=0 \end{cases}$.



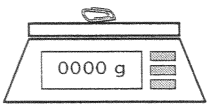
○ A. The exact solution is $(0.6\ ,\ 1.1)$.

○ B. The exact solution is $(1\ ,\ 1)$.

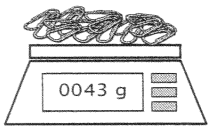
○ C. The approximate solution is $(0.6\ ,\ 1.1)$.

○ D. The approximate solution is $(1\ ,\ 1)$. (17)

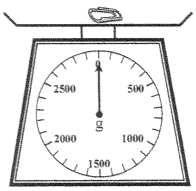
7. John has 100 paper clips, a kitchen scale and an electronic balance. He wants to find out the weight of one paper clip. Which of the following is the best method?

○ A. 

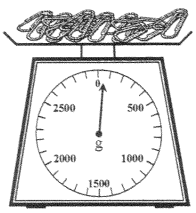
John weighs one paper clip on an electronic balance.

○ B. 

John weighs 100 paper clips on an electronic balance and then divides the total weight by 100.

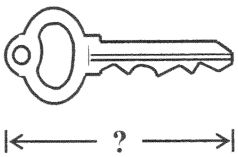
○ C. 

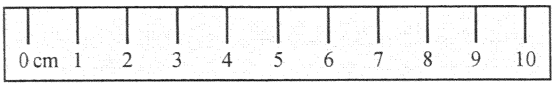
John weighs one paper clip on a kitchen scale.

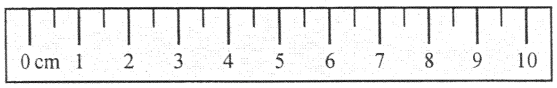
○ D. 

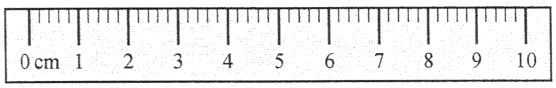
John weighs 100 paper clips on a kitchen scale and then divides the total weight by 100. (18)

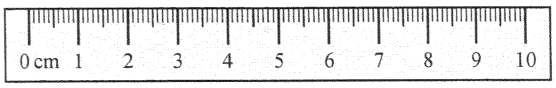
8. Alex wants to measure the length of a key. Which of the following rulers gives the length with the smallest error?



○ A. 

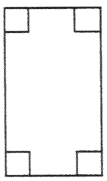
○ B. 

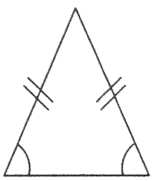
○ C. 

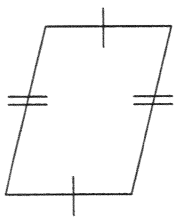
○ D. 

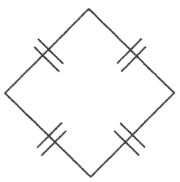
(19)

9. Which of the following is an equilateral polygon?

○ A. 

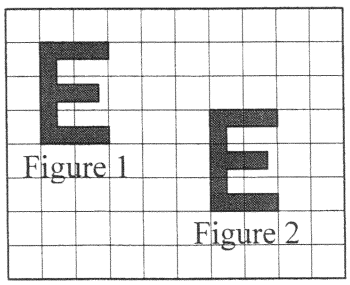
○ B. 

○ C. 

○ D. 

(20)

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



○ A. rotation .

○ B. reflection .

○ C. translation .

○ D. enlargement .

(21)

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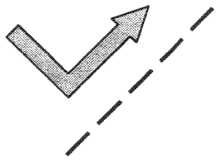
Marker's Use Only

11.

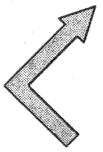


Find the image of the above figure after reflecting in the dotted line.

○ A. 

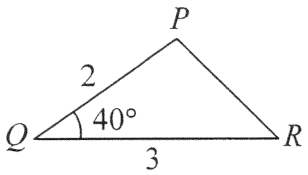
○ B. 

○ C. 

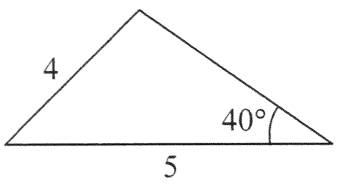
○ D. 

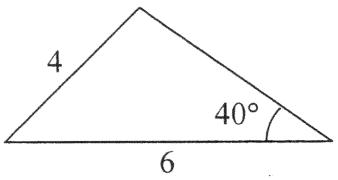
(22)

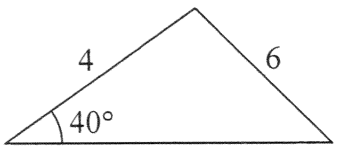
12.

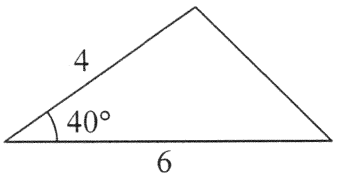


Which of the following triangles is similar to ΔPQR as shown in the above figure?

○ A. 

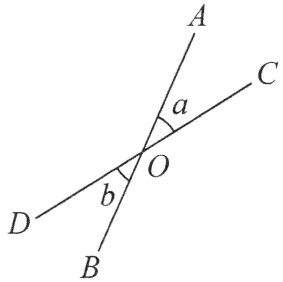
○ B. 

○ C. 

○ D. 

(23)

13. In the figure, AB and CD are straight lines intersecting at O. a and b are



○ A. alternate angles .

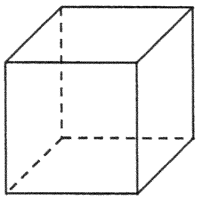
○ B. angles at a point .

○ C. vertically opposite angles .

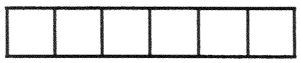
○ D. adjacent angles .

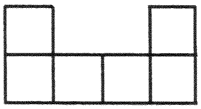
(24)

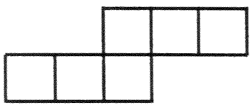
14.

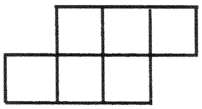


Which of the following nets can be folded into a cube?

○ A. 

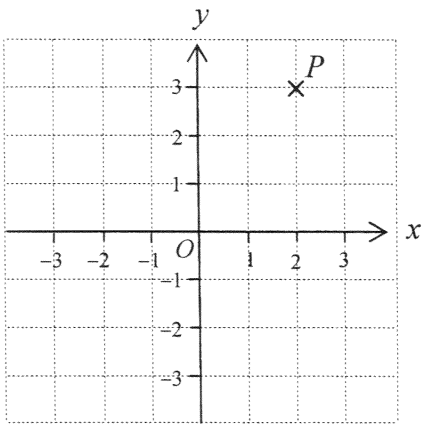
○ B. 

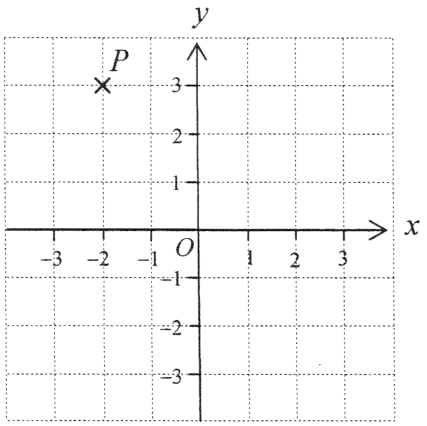
○ C. 

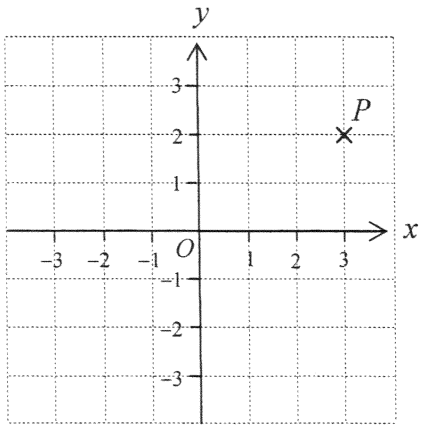
○ D. 

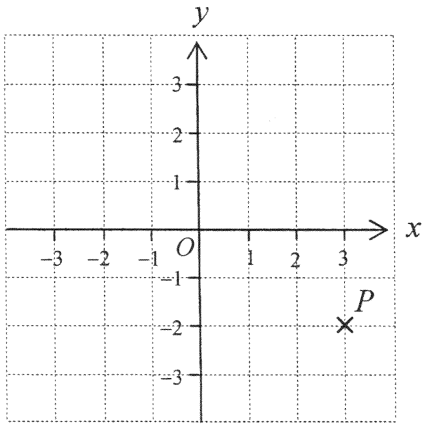
(25)

15. Which of the following rectangular coordinate planes shows the position of the point $P(-2, 3)$?

○ A. 

○ B. 

○ C. 

○ D. 

(26)

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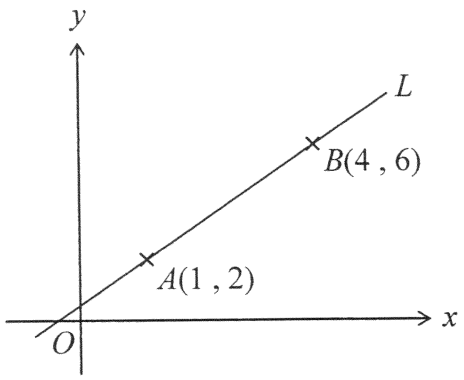
16. In the figure, the straight line L passes through $A(1, 2)$ and $B(4, 6)$. Which of the following gives the slope of L?

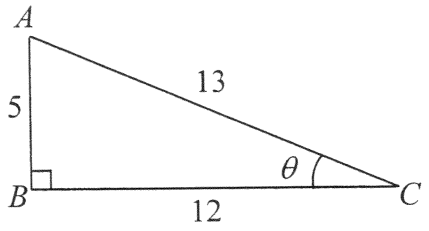


○ A. $\frac{4-1}{6-2}$ ○ B. $\frac{4+1}{6+2}$

○ C. $\frac{6-2}{4-1}$ ○ D. $\frac{6+2}{4+1}$

(27)

17. Refer to the figure. Find the value of $\sin\theta$.

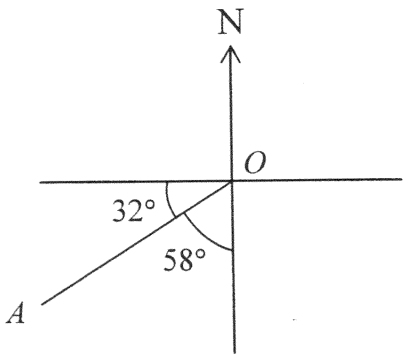


○ A. $\frac{5}{12}$ ○ B. $\frac{13}{12}$

○ C. $\frac{5}{13}$ ○ D. $\frac{12}{13}$

(28)

18. In the figure, the bearing of A from O is



○ A. S32°W. ○ B. N32°E.

○ C. S58°W. ○ D. N58°E.

(29)

19. Mrs. Chan recorded the body length of her baby from birth to 12 months.

Age (month)	0	1	2	3	4	5	6	7	8	9	10	11	12
Body length (cm)	46	51	54	57	59	61	63	65	66	68	69	70	71

She uses a statistical chart to show the change in body length of her baby from birth to 12 months. Which of the following is most appropriate?

○ A. Histogram ○ B. Scatter diagram

○ C. Broken-line graph ○ D. Stem-and-leaf diagram

(30)

20. The mathematics examination consists of two papers: I and II. The table below shows the weight of each paper and David's marks.

Paper	I	II
Weight	3	2
Mark	70	30

Find David's weighted mean mark.

○ A. 50 ○ B. 54 ○ C. 135 ○ D. 270 (31)

21. A $1 coin was tossed 500 times. The frequencies of the sides showed up are:

Outcome:		
Frequency:	238	262

What is the empirical probability of getting  in a toss?

○ A. 0.238 ○ B. 0.262 ○ C. 0.476 ○ D. 0.524 (32)

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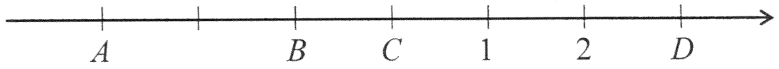
Marker's Use Only

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

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

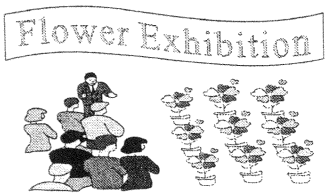


Answers : $A =$ _____ , $B =$ _____ , $C =$ _____ , $D =$ _____

1 mark (33)

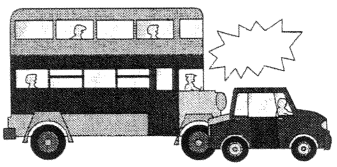
23. Determine whether the number of people recorded in each of the following news reports is the exact value or the estimated value.

(i) The organizer claimed that 3 000 people attended the flower exhibition in Victoria park this year.
(* Circle the answer)



Answer : * Exact value / Estimated value

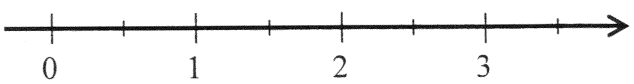
(ii) 224 people were killed in traffic accidents last year.
(* Circle the answer)



Answer : * Exact value / Estimated value

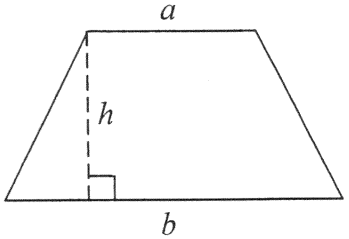
1 mark (34)

24. Use "×" to mark the number $\sqrt{3}$ on the number line.



1 mark (35)

25. In the figure, the area A of the trapezium is given by $A = \frac{(a+b)h}{2}$. If $a = 5$, $b = 9$ and $h = 4$, find the value of A.



Answer : $A =$ _____

1 mark (36)

Marker's Use Only

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

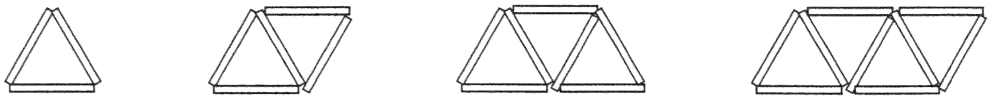


Figure 1 Figure 2 Figure 3 Figure 4

According to the above pattern, how many sticks should Paul use in Figure 5?

Answer : Paul should use _____ sticks in Figure 5.

1 mark (37)

27. Consider the polynomial $5x^4 - x^2 + 7x - 2$. Find the coefficient of x^2.

Answer : The coefficient of x^2 is _____ .

1 mark (38)

28. Simplify $(x + 2xy) - (3x - xy)$.

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

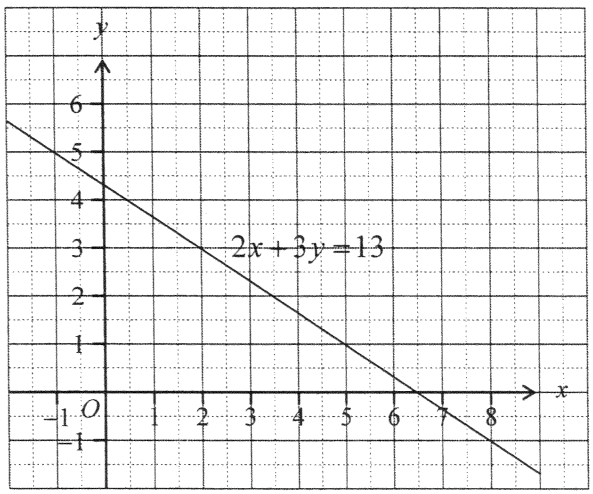
1 mark (39)

29. Factorize $15x^2 - 10xy$.

Answer : $15x^2 - 10xy$ = _____

1 mark (40)

30.



The figure above shows the graph of the equation $2x + 3y = 13$. Which of the following points lie(s) on the graph? (There may be more than one answer.)

$P(2 , 3)$, $Q(4 , 0.5)$, $R(6.5 , 0)$, $S(8 , 1)$

Answer : _____

1 mark (41)

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Marker's Use Only

31. Expand $(x-5)(2x+5)$.

Answer : $(x-5)(2x+5)$ = _____

1 mark (42)

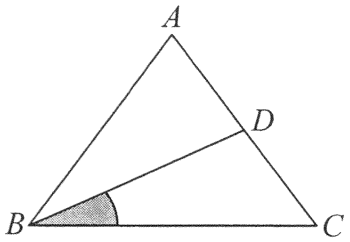
32. Fill in the boxes with $<$ or $>$.

(i) 5 ☐ 7

(ii) -4 ☐ -6

1 mark (43)

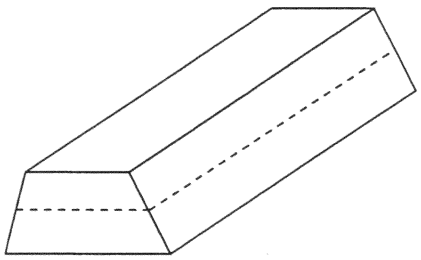
33. Name the shaded angle in the figure.



Answer : _____

1 mark (44)

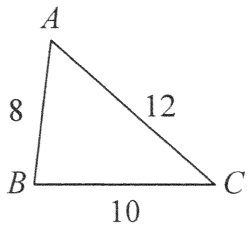
34. The figure shows a solid prism. Sketch the cross-section when it is cut along the dotted line.

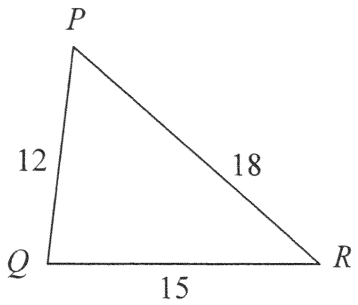


Cross section : _____

1 mark (45)

35.





State whether ΔABC and ΔPQR are congruent or similar triangles, and give reason.

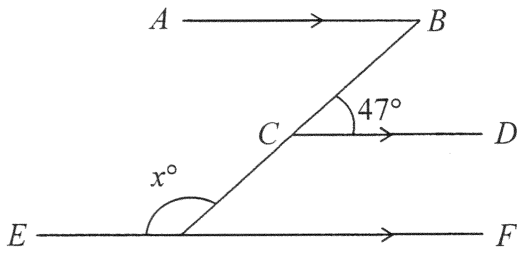
Answer : ΔABC and ΔPQR are _____ triangles.

The reason is _____ .

1 mark (46)

Marker's Use Only

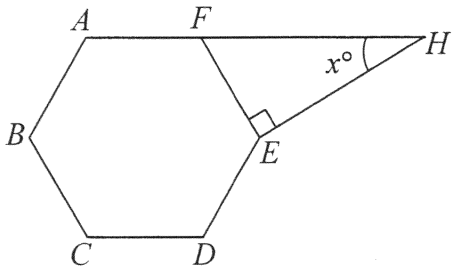
36. In the figure, AB, CD and EF are parallel lines. Find the value of x.



Answer : $x =$ _____

1 mark (47)

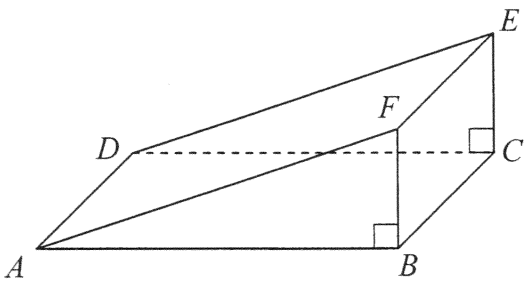
37. The figure shows a regular hexagon $ABCDEF$ and a right-angled triangle EFH. AFH is a straight line. Find the value of x.



Answer : $x =$ _____

1 mark (48)

38.

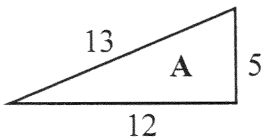


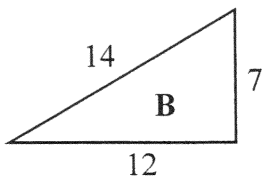
The figure shows a triangular prism, where $ABCD$ and $BCEF$ are rectangles. $ABCD$ is a horizontal plane and $BCEF$ is a vertical plane. Name the angle between the line AF and the plane $ABCD$.

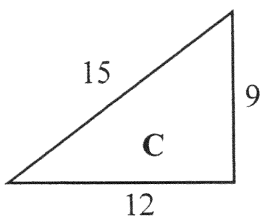
Answer : _____

1 mark (49)

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







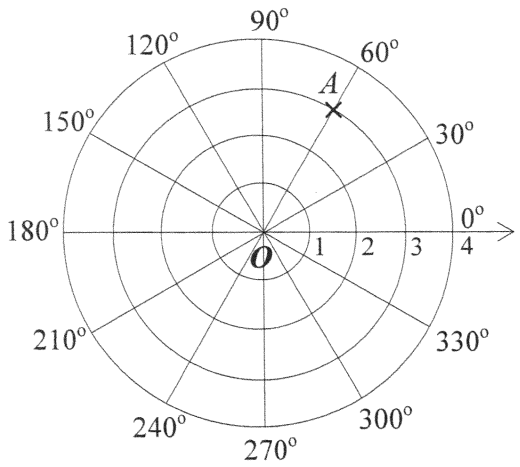
Answer : _____

1 mark (50)

Go on to the next page

Marker's Use Only

40. In the polar coordinate plane, the polar coordinates of A are (_____ , _____).



1 mark (51)

41. A teacher wants to find out the most popular kind of books among the students. Put the following stages in order. Example: (1) → (2) → (3) → (4)

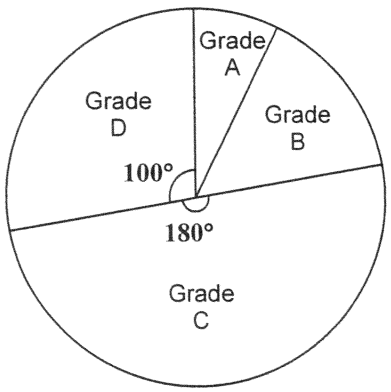
(1) Present the data using a pie chart.
(2) Collect the records of borrowed books from the school library.
(3) Read from the pie chart the most popular kind of books among the students.
(4) Organize and tabulate the records of borrowed books by their kinds.

Answer : _____

1 mark (52)

42. The pie chart below shows the grades of 198 students in a science project.

Grades of 198 students in a science project



(a) Which grade do the most students get?

Answer : The most students get Grade _____ .

1 mark (53)

(b) How many students get Grade D?

Answer : _____ students get Grade D.

1 mark (54)

(c) There are 30 students getting Grade B in the project. Find the number of students getting Grade A.

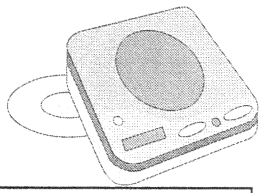
Answer : _____ students get Grade A.

1 mark (55)

Marker's Use Only

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

43. Tom bought a CD player for \$720. After one month, he sold it to Mary at a loss of 30%. How much did Mary pay for the CD player?



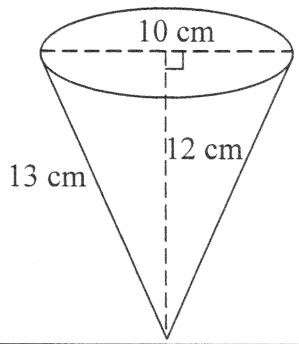
(Show your working)

1 mark (56)

1 mark (57)

1 mark (58)

44. The figure shows a right circular cone of base diameter 10 cm and height 12 cm. Its slant height is 13 cm.



(a) Find the volume of the cone in terms of π.

(Show your working)

1 mark (59)

1 mark (60)

(b) Find the curved surface area of the cone in terms of π.

(Show your working)

1 mark (61)

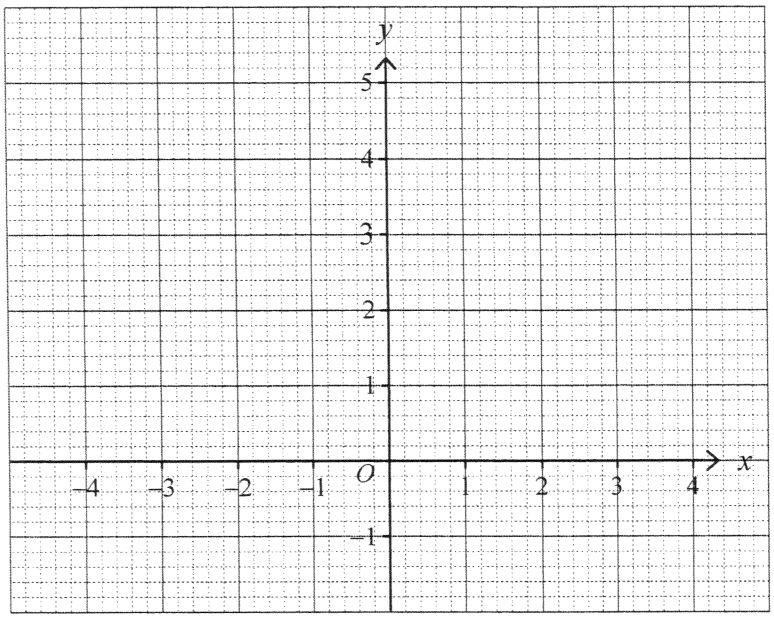
1 mark (62)

1 mark (63)

Marker's Use Only

45. Given that $x + 2y = 4$. Complete the following table and draw the graph of $x + 2y = 4$ on the given rectangular coordinate plane.

x	-4	0	4
y		2	



1 mark (64)

1 mark (65)

46. Given the formula $s = ut + \frac{1}{2}at^2$. If $s = 39$, $t = 3$ and $a = 4$, find the value of u.

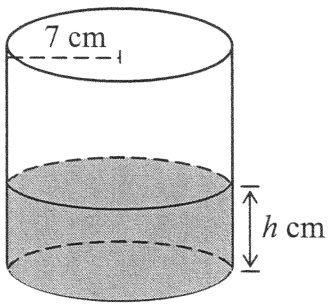
(Show your working)

1 mark (66)

1 mark (67)

Marker's Use Only

47. A cylindrical vessel of base radius 7 cm contains 245π cm^3 of water. The height of water is h cm. Find the value of h.

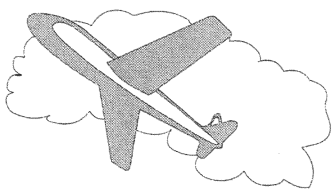


(Show your working)

1 mark (68)

1 mark (69)

48. An aeroplane flying with constant speed travels 120 km in 10 minutes. Find the distance that the aeroplane travels in 4 hours.



(Show your working)

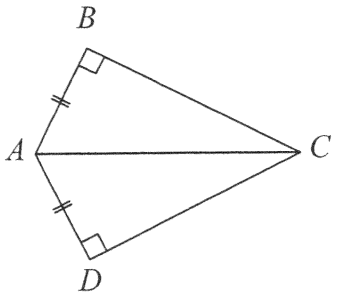
1 mark (70)

1 mark (71)

1 mark (72)

Marker's Use Only

49. In the figure, $\angle ABC = 90°$, $\angle ADC = 90°$ and $AB = AD$. Prove that $\Delta ABC \cong \Delta ADC$.



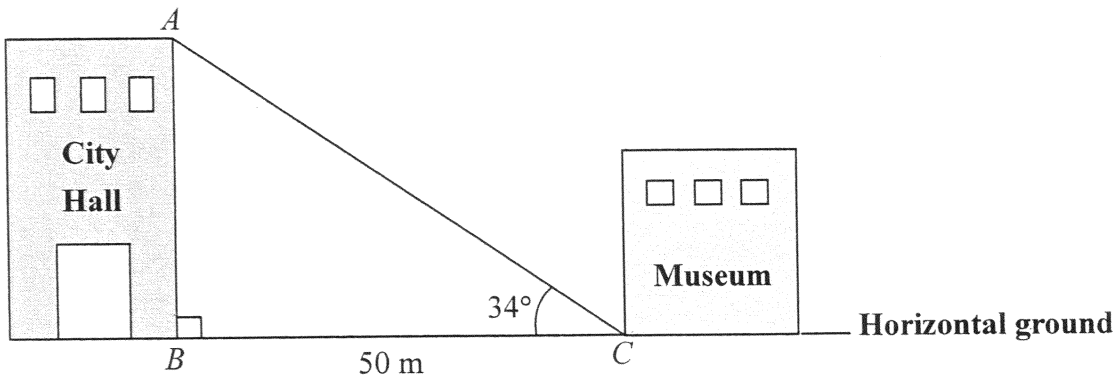
(Proof)

1 mark (73)

1 mark (74)

1 mark (75)

50.



In the figure, AB is the height of the City Hall. The length of BC is 50 m and the angle of elevation of A from C is 34°. Find AB correct to 1 decimal place.

(Show your working)

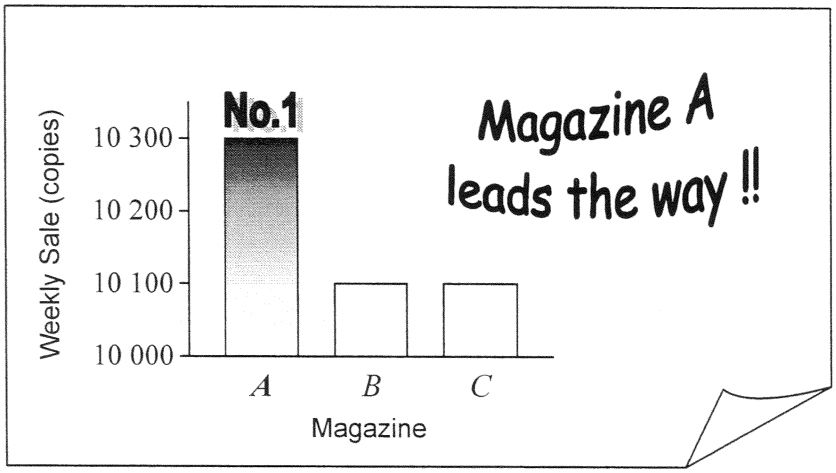
1 mark (76)

1 mark (77)

1 mark (78)

Marker's
Use Only

51. The following advertisement is cut from a newspaper.



(a) What are the weekly sales of magazines A, B and C ?

Answer: The weekly sales of magazine A are _____ copies.
The weekly sales of magazine B are _____ copies.
The weekly sales of magazine C are _____ copies.

1 mark (79)

(b) Explain why the bar chart is misleading.

1 mark (80)

52. The heights of five players in a basketball team are 170 cm, 179 cm, 184 cm, 185 cm and 197 cm. Find their mean height.

(Show your working)

1 mark (81)

1 mark (82)

1 mark (83)

END OF PAPER

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