

இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரීட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம் இலங்கைப் பரீட்சைத் திணைக்களம்
 Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka
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 Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka

32 E I

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2019 දෙසැම්බර්
 கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2019 டிசெம்பர்
 General Certificate of Education (Ord. Level) Examination, December 2019

09.12.2019 / 0830 - 1030

ගණිතය I
 கணிதம் I
 Mathematics I

පැය දෙකයි
 இரண்டு மணித்தியாலம்
 Two hours

Index Number:

Certified Correct

Signature of Invigilator

Important:

- * This question paper consists of 8 pages.
- * Write your **Index Number** correctly in the appropriate places on **this page** and on **page three**.
- * Answer **all** questions on **this question paper** itself.
- * Use the space provided under each question for working and writing the answer.
- * Indicate the **relevant steps** and the **correct units** when answering the questions.
- * Marks are awarded as follows:
In Part A
 2 marks for each question
In Part B
 10 marks for each question
- * Blank papers can be obtained for scratch work.

For Marking Examiners' Use Only

Part	Question Numbers	Marks
A	1 – 25	
	1	
	2	
B	3	
	4	
	5	
Total		

..... First Examiner Code Number
..... Second Examiner Code Number
..... Arithmetic Checker Code Number
..... Chief Examiner Code Number

[see page two]

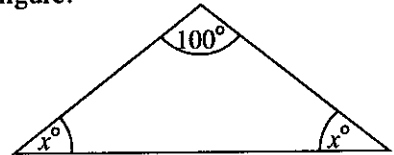
Part A*Answer all questions on this question paper itself.*

- Area of the curved surface of a right circular cylinder of radius r and height h is $2\pi rh$.

1. Customs duty of 9% is charged for a certain item that is imported. If the value of this item is 6000 rupees, find the amount that has to be paid as customs duty.

2. Find the factors: $x^2 + 3x - 10$

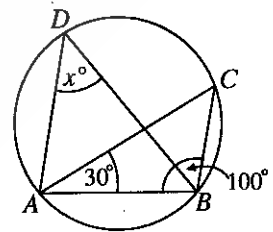
3. Find the value of x according to the information given in the figure.



4. If it is given that $\log_2 a = 5$, write the value of a as a power of 2.

5. Find the time it takes to fill a tank of capacity 420 litres using a pipe through which water flows at a rate of 60 litres per minute.

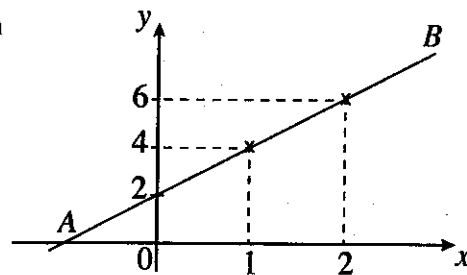
6. The points A, B, C and D lie on the circle shown in the figure.
 $\angle ABC = 100^\circ$ and $\angle CAB = 30^\circ$. Find the value of x .



7. The base radius of a solid right circular cylinder is 7 cm. Its height is 10 cm. Find the area of the curved surface of the cylinder. (Use $\frac{22}{7}$ for the value of π .)

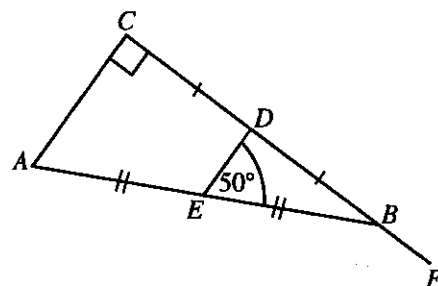
[see page three]

8. Find the gradient of the straight line represented by AB in the figure.



9. Simplify : $\frac{ax}{2} \div \frac{3a}{4x}$

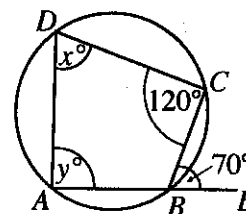
10. In the given figure, the side CB of the right angled triangle ABC is produced to F . The midpoints of AB and CB are E and D respectively. If $\angle DEB = 50^\circ$, find the magnitude of $\angle EBF$.



11. Solve: $2x^2 - 8 = 0$

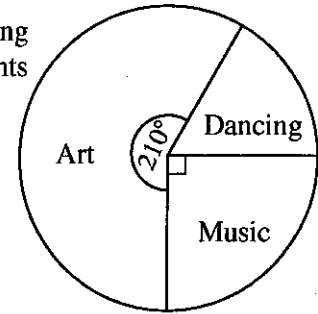
12. A man takes a loan of 5000 rupees for two years at an annual interest of 8% with the interest compounded annually. How much is the interest for the second year for this loan amount?

13. A cyclic quadrilateral $ABCD$ is shown in the figure. The side AB is produced to E . Moreover, $\angle BCD = 120^\circ$ and $\angle CBE = 70^\circ$. Find the values of x and y according to the given information.



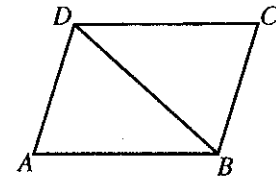
[see page four]

14. The students in a certain school who study the subjects Art, Dancing and Music are represented by the pie chart. If the number of students who study Music is 45, how many students study Dancing?



15. Express the sixth term in the geometric progression 9, 27, 81, ... as a power of 3.

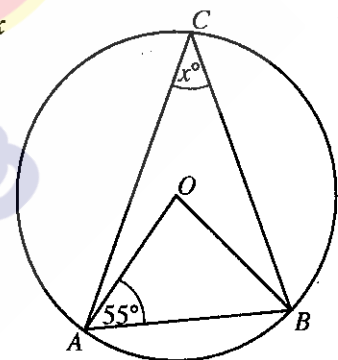
16. A parallelogram $ABCD$ is given in the figure. For each statement in the table, if it is correct mark a '✓' in front of it and if it is incorrect mark a '✗' in front of it.



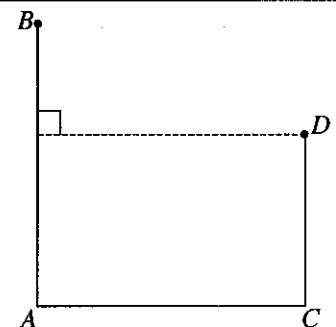
(1)	Area of the triangle $ABD = \frac{1}{2} \times$ area of the parallelogram $ABCD$	
(2)	The diagonal DB bisects $\angle ADC$.	

17. Find the least common multiple of the following three algebraic terms:
 $3x^2$, $6xy$, $2y$

18. The centre of the circle in the given figure is O . Find the value of x according to the information indicated in it.



19. Two vertical pillars AB and CD located on a level ground are shown in the figure. When observed from D , the angle of elevation of B is 42° and the angle of depression of A is 58° . Represent this information in the figure.



[see page five]

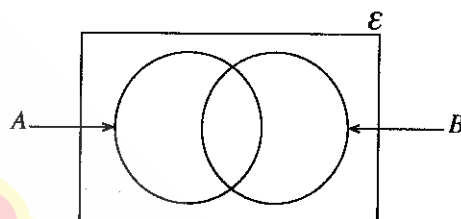
20. A bag contains 35 identical marbles. A certain number of them are white while the rest are black. If the probability of a marble picked randomly from the bag being black is $\frac{5}{7}$, how many black marbles are there in the bag?

21. Fill in the blanks in the following statement using suitable geometric terms.
 "The straight line joining the centre of a circle to the of a chord of the circle is to the chord".

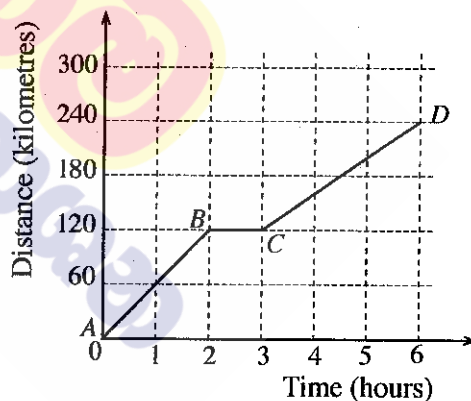
22. Find the value of x if

$$\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} \begin{pmatrix} 2 & -1 \\ -1 & 1 \end{pmatrix} = \begin{pmatrix} 5 & x \\ -4 & 3 \end{pmatrix}.$$

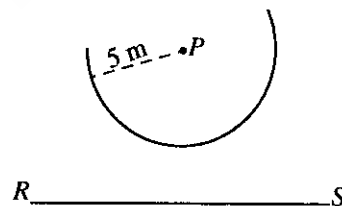
23. From the group of students who are represented in the given Venn diagram, the set of students who like Mathematics is represented by A and the set of students who like Science is represented by B . In the Venn diagram, shade the regions that represent the students who like only one of these two subjects.



24. A distance-time graph that represents the motion of a motor vehicle is shown in the figure. Which part of the graph represents the motor vehicle travelling with the greater speed? What is this speed?



25. A portion of the locus of a point that moves at a constant distance of 5 m from the given point P is indicated by the arc in this sketch. The straight line RS is at a distance of 7 m from P . Indicate by a sketch on this figure, how the points on the arc which are at a distance of 5 m from the straight line RS also, are found.



Part B

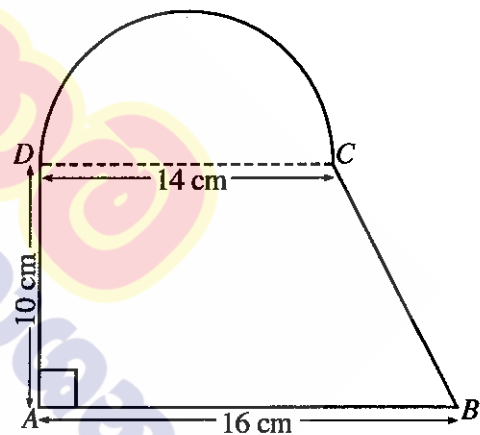
Answer *all* questions on this question paper itself.

1. $\frac{7}{15}$ of the total length of a drain was dug on the first day and $\frac{1}{4}$ of the remaining length was dug on the second day.
- At the end of the first day, what fraction of the total length of the drain remained to be dug?
 - What fraction of the total length of the drain was dug on the second day?
 - At the end of the first two days, a further length of 600 metres of the total length of the drain remained to be dug. Find the total length of the drain.
 - It has been estimated that 4 men will require 3 days to dig the remaining 600 metres of the drain. How many more men need to be engaged to dig this length in two days?

10

2. A sheet consists of a portion $ABCD$ in the shape of a trapezium and a semi-circular portion with diameter DC , as shown in the figure. (Take the value of π as $\frac{22}{7}$.)

- It has been decided to attach small buttons along the edge of the semi-circular portion, starting from D and ending at C , such that the distance between every two adjacent buttons is 2 cm. How many buttons are required for this?



- Calculate the total area of the sheet.
- If a rectangular sheet is made with its area equal to the area of the semi-circular portion and its length equal to the length of AD , then find its breadth.

10

[see page seven]

3. Kumara runs a business within an urban council limits.

(a) The assessed annual value of his business place is 40 000 rupees. The urban council charges annual rates of 22%.

(i) Find the amount that has to be paid annually as rates.

(ii) How much does he have to pay as rates for a quarter?

(b)

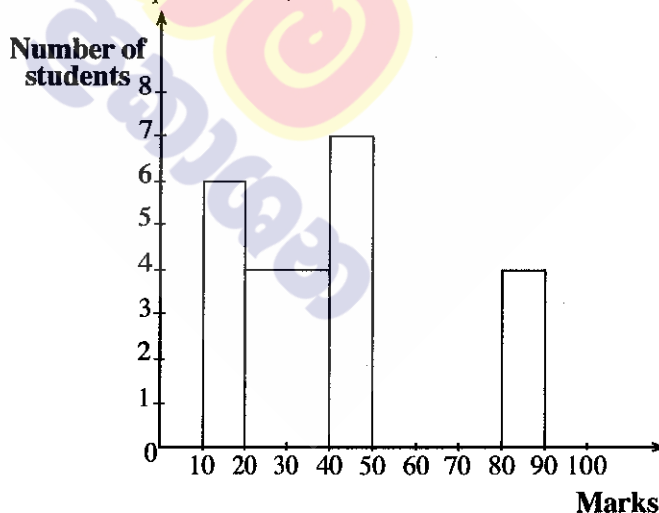
Annual income (rupees)		Income tax percentage
Initial	500 000	tax free
Next	500 000	4%
Next	500 000	8%

Kumara pays 12 000 rupees as income tax for a year, based on the above table. What is his annual income?

10

4. The following incomplete frequency distribution and corresponding incomplete histogram have been prepared using the marks obtained in a test by 40 students in a class. Here 10 – 20 denotes the marks interval “greater than 10 and less than or equal to 20”, and the other intervals denote similarly.

Marks	Number of students
10 – 20	6
20 – 40	...
40 – 50	...
50 – 80	15
80 – 90	...
Total	40



(i) Complete the above frequency table and histogram.

(ii) Express the number of students who obtained more than 40 marks as a percentage of the total number of students.

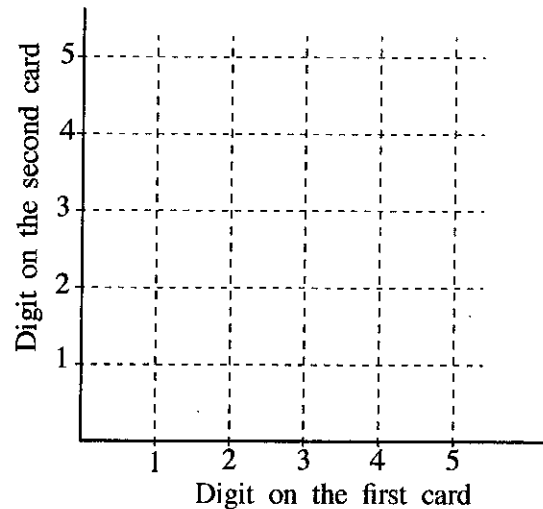
(iii) Draw the frequency polygon on the histogram.

10

[see page eight]

5. (a) It is given that the first two symbols of a certain password are two different digits from the digits 1, 2, 3, 4, 5. To choose the first digit of the password, a student randomly picks a card from five identical cards on each of which one of these digits is written. Then, **without replacing** it, he randomly picks another card to choose the second digit.

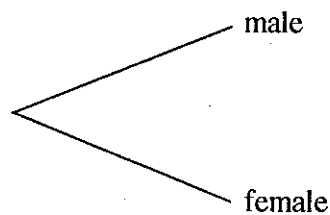
- (i) Using the symbol 'x', mark the sample space of the two digits on the cards that the student randomly picks, on the given grid.



- (ii) It was later discovered that the first digit which was obtained for the password was odd and that this digit was less than the second digit that was obtained. Indicate the event that satisfies these conditions on the sample space and obtain its probability.

- (b) During a period when a certain disease was spreading, 20 males and 16 females who displayed the symptoms of this disease arrived to obtain medication from a physician. Although all the females actually had the disease, the probability of a person picked at random from among the males actually having the disease was 0.6.

A portion of a tree diagram drawn to indicate the probabilities of a person picked at random from all these people, being a male or a female and being a person having the disease or not having it is shown below.



- (i) Complete the tree diagram by indicating all the relevant probabilities.
- (ii) Find the probability of a person picked at random being a person having the disease.

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
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 Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka Department of Examinations, Sri Lanka

32 E II

අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2019 දෙසැම්බර්
 கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2019 டிசெம்பர்
 General Certificate of Education (Ord. Level) Examination, December 2019

ගණිතය II
 கணிதம் II
 Mathematics II

09.12.2019 / 1300 - 1610

පැය තුනයි
 மூன்று மணித்தியாலம்
 Three hours

අමතර කියවීමේ කාලය - මිනිත්තු 10 යි
 மேலதிக வாசிப்பு நேரம் - 10 நிமிடங்கள்
 Additional Reading Time - 10 minutes

Use **additional reading time** to go through the question paper, select the questions and decide on the questions that you give priority in answering.

Important:

- * Answer **ten** questions selecting **five** questions from **Part A** and **five** questions from **Part B**.
- * Write the **relevant steps** and the **correct units** in answering the questions.
- * Each question carries **10** marks.
- * The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$.

Part AAnswer **five** questions only.

1. The following notices have been published by Bank A and Company B.

Bank A	Company B
An interest of 9% per annum is paid for fixed deposits.	Price of a share is 25 rupees and dividends of 1.50 rupees per share is paid annually.

- (i) Kamal deposited exactly half of the amount of 100 000 rupees he had in a fixed deposit in Bank A and spent the remaining amount in buying shares in Company B. At the end of a year he obtains the dividends from Company B and sells all the shares at 26 rupees per share. Show giving reasons, from which investment he receives a greater income at the end of a year.
- (ii) Express the total income he receives at the end of a year as a percentage of the total amount invested.
2. An incomplete table showing the y -values corresponding to several x -values of the quadratic function $y = x^2 - 2x$, within the interval $-2 \leq x \leq 4$, is given below.

x	-2	-1	0	1	2	3	4
y	8	3	0	-1	0	...	8

- (i) Find the value of y when $x = 3$.
- (ii) Using the standard system of axes and a suitable scale, draw the graph of the given quadratic function on a graph paper, according to the above table of values.
- (iii) Write the coordinates of the turning point of the graph.
- (iv) Express the given quadratic function in the form $y = (x-a)^2 + b$. Here, a and b are two numbers.
- (v) Write the interval of values of x on which the function increases within the interval $-1 < y \leq 3$.

[see page two]

3. (a) There are 5 boys and 4 girls in a group of dancers. In a certain performance, all the boys wore costumes of the same price and all the girls too wore costumes of the same price. The price of two boys' costumes was 1000 rupees more than the price of three girls' costumes. The cost of the costumes of all the children in the group was 14 000 rupees.

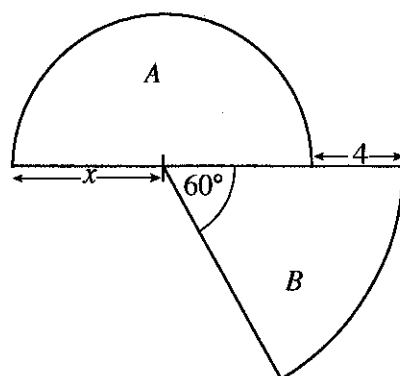
(i) Take the price of a boy's costume as x rupees and the price of a girl's costume as y rupees and construct a pair of simultaneous equations that represents the above information.

(ii) By solving these equations, find separately the price of a boy's costume and the price of a girl's costume.

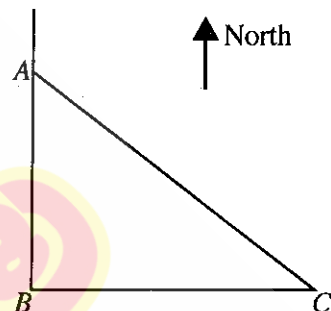
(b) Simplify: $\frac{5x}{x^2-1} - \frac{4}{x+1}$

4. A lamina consisting of a semi-circle A of radius x units and a sector B with angle at the centre 60° , which is concentric with the semi-circle, is shown in the figure. If the area of A and the area of B are equal, show that x satisfies the quadratic equation $x^2 - 4x - 8 = 0$ and show with reasons that x can take exactly one value.

By using 1.73 for the value of $\sqrt{3}$, find an approximate value for the radius of the sector B , to the first decimal place.



5. A man standing at point A of a level ground observes a mango tree at point C , a distance of 100 metres away from him on a bearing of 127° . He also observes a coconut tree at point B which is to the south of point A and to the west of point C . A rough sketch of the locations of the points A , B and C is given in the figure.



- (i) Copy the given figure onto your answer script and indicate the above information in it.
- (ii) Using the trigonometric tables, find the distance AB between the man and the coconut tree, to the nearest metre.
- (iii) On the copied figure, mark the point D which is exactly halfway between the man and the coconut tree, and the point E which is 118 metres to the west of the coconut tree at point B . Using the approximate value obtained in part (ii) above for the distance AB , and the trigonometric tables, find the magnitude of \hat{BDE} .
6. Information collected on the masses of a sample of 40 bags of items that were brought to be loaded into a lorry is given in the following frequency table. Here, $0-10$ denotes the mass interval "greater than 0 and less than or equal to 10" and the other intervals denote similarly.

Mass of a bag of items (kg)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Number of bags (frequency)	2	5	7	9	8	6	3

- (i) Find the mean mass of a bag of items according to the given information.
- (ii) If the above sample has been obtained from a stock of 200 bags of items, estimate the total mass of the stock of bags of items.
- (iii) If it is given that the maximum mass that can be loaded into the lorry is 1500 kg, give reasons to show that there can be instances when the above 40 bags of items cannot be loaded into the lorry.

[see page three]

Part B*Answer five questions only.*

7. Sunitha who hopes to participate in a sports event trains by jogging daily. She spends 105 minutes in the first week and 119 minutes in the second week for this. The time she spends training each week when taken consecutively, lie in an arithmetic progression.
- Find the common difference of this arithmetic progression.
 - Find in minutes, the time she spends training in the 7th week.
 - In which week does the time she spends training during a week first exceed 221 minutes?
 - (a) Find the total time she spends jogging during the first 10 weeks of training.
(b) If the average speed at which she jogs is 6 km h^{-1} , find the total distance she jogs during that time.

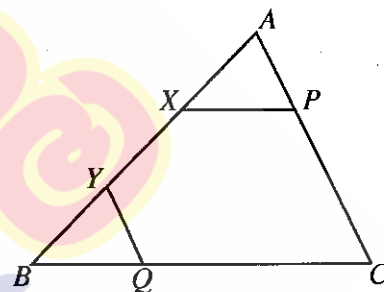
8. Use only a straight edge with a cm/mm scale and a pair of compasses for the following constructions. The construction lines should be drawn clearly.

- Construct a straight line segment AC of length 6 cm and construct the line AB such that $\hat{CAB} = 60^\circ$.
- Construct the angle bisector of \hat{CAB} .
- Construct the circle that has its centre O on the above constructed angle bisector and touches AC at C . Produce the line AO such that it meets the circle at D .
- Construct the tangent to the circle at D and mark the point of intersection of this tangent and AC produced as P .
- Give reasons why $\hat{DPC} = \hat{AOC}$.

9. In the given figure, ABC is a triangle. X and Y are two points on AB such that $AX = BY$. Moreover, P is a point on AC such that $XP \parallel BC$ and Q is a point on BC such that $YQ \parallel AC$.

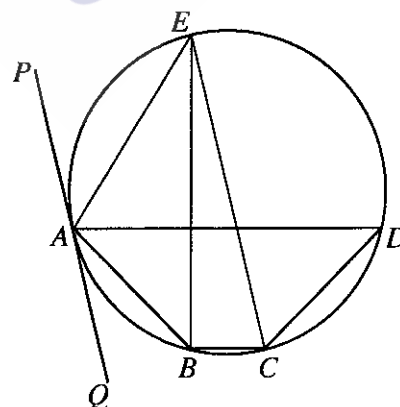
Copy the given figure onto your answer script and indicate the above information in it.

- Show that $\triangle AXP \equiv \triangle BYQ$.
- Draw the straight line PQ and show that $PQ \parallel AB$.
- The lines PX and QY produced meet at D . If $DX = XP$, show that $XY = \frac{1}{2}PQ$.



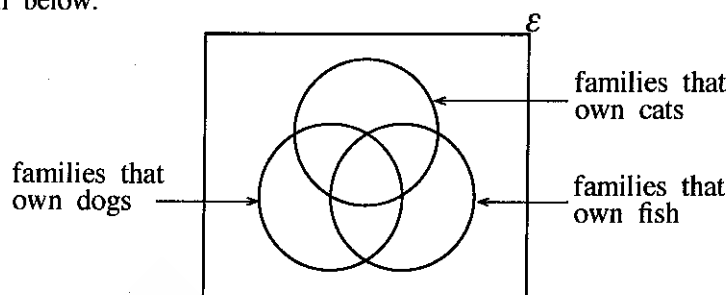
10. In the cyclic quadrilateral $ABCD$ shown in the figure, $\hat{DAB} = \hat{ADC} = 45^\circ$. The straight line drawn from B perpendicular to AD meets the circle at E . The line PAQ is the tangent drawn to the circle at A .

Prove that CE is a diameter of the circle and that it is parallel to the tangent PAQ .

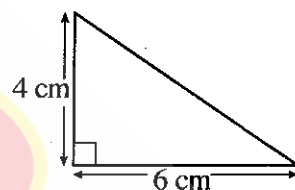


[see page four]

11. A survey was conducted on 115 families that own pets. Information on the families that own dogs, cats and fish as pets from these families and an incomplete Venn diagram drawn corresponding to it are given below.



- 4 families own all the above three types of pets.
 - The number of families that own only dogs is 19.
 - 24 families own both dogs and cats while 21 families own both dogs and fish.
 - 11 families do not own any of the above three types of pets.
- (i) Copy the given Venn diagram onto your answer script and include the above information in it.
- (ii) The number of families that own dogs is twice the number of families that own fish. Find the number of families that own fish but do not own dogs.
- (iii) How many families own only cats?
- (iv) The number of families that own only fish is twice the number of families that own cats and fish but not dogs. Find the probability of a family selected at random from those surveyed being a family that owns only fish.
12. A hemispherical container of radius r is completely filled with water. This water is poured into a glass container in the shape of a prism, having a triangular cross section with the measurements shown in the figure, such that no water spills out. Then the water fills this glass container to a height of 10 cm. Show that the radius r of the hemispherical container is obtained by $r = \sqrt[3]{\frac{180}{\pi}}$ cm, and taking the value of π as 3.14, find the value of r in centimetres to the first decimal place.



Part A

Answer all questions on this question paper itself.

- Area of the curved surface of a right circular cylinder of radius r and height h is $2\pi rh$.

1. Customs duty of 9% is charged for a certain item that is imported. If the value of this item is 6000 rupees, find the amount that has to be paid as customs duty.

Rs. 540 _____ ②

$6000 \times \frac{9}{100}$ _____ 1

2. Find the factors: $x^2 + 3x - 10$

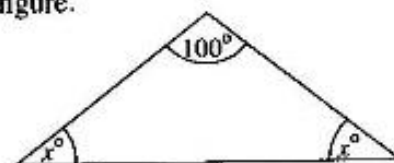
$(x+5)(x-2)$ _____ ②

$x^2 - 5x + 2x - 10$ _____ 1

3. Find the value of x according to the information given in the figure.

40 or $x = 40$ _____ ②

$x + x + 100 = 180^\circ$ _____ 1



4. If it is given that $\log_2 a = 5$, write the value of a as a power of 2.

$a = 2^5$ _____ ②

or

2^5

5. Find the time it takes to fill a tank of capacity 420 litres using a pipe through which water flows at a rate of 60 litres per minute.

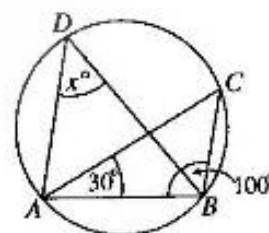
7 minutes _____ ②

$\frac{420}{60}$ _____ 1

6. The points A, B, C and D lie on the circle shown in the figure. $\angle ABC = 100^\circ$ and $\angle CAB = 30^\circ$. Find the value of x .

50 or $x = 50$ _____ ②

$\angle ACB = x^\circ / 30^\circ + 100^\circ + \angle CAB = 180^\circ$ _____ 1



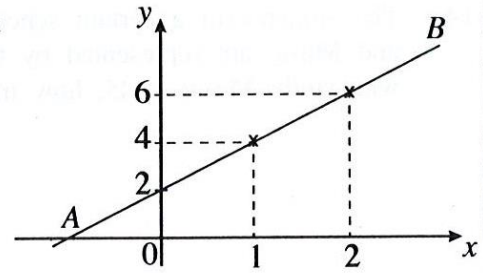
7. The base radius of a solid right circular cylinder is 7 cm. Its height is 10 cm. Find the area of the curved surface of the cylinder. (Use $\frac{22}{7}$ for the value of π .)

440 cm^2 _____ ②

$2 \times \frac{22}{7} \times 7 \times 10$ _____ 1

8. Find the gradient of the straight line represented by AB in the figure.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 4}{2 - 1} = \frac{4 - 6}{1 - 2} = 2$$

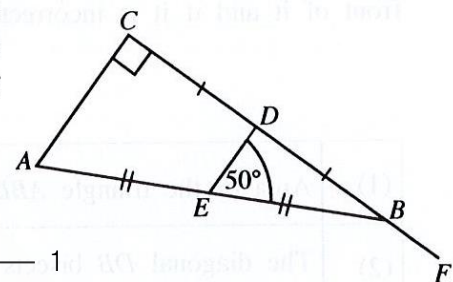


9. Simplify : $\frac{ax}{2} \div \frac{3a}{4x}$

$$\frac{2x}{3} \times \frac{4x}{3a} = \frac{8x^2}{3a}$$

$$\frac{ax}{2} \div \frac{3a}{4x} = \frac{4x^2}{3a}$$

10. In the given figure, the side CB of the right angled triangle ABC is produced to F . The midpoints of AB and CB are E and D respectively. If $\angle DEB = 50^\circ$, find the magnitude of $\angle EBF$.



$$\angle EBF = 140^\circ$$

11. Solve: $2x^2 - 8 = 0$

$$2x^2 - 8 = 0 \Rightarrow 2(x^2 - 4) = 0 \Rightarrow 2(x - 2)(x + 2) = 0 \Rightarrow x = 2 \text{ or } x = -2$$

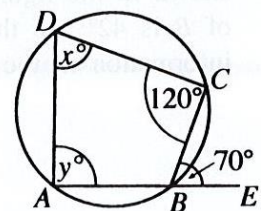
12. A man takes a loan of 5000 rupees for two years at an annual interest of 8% with the interest compounded annually. How much is the interest for the second year for this loan amount?

$$\text{Rs. } 432$$

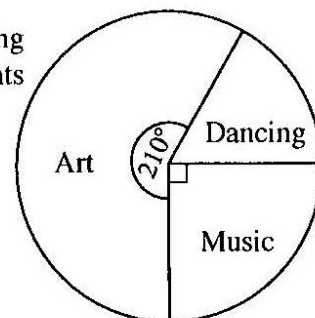
$$5000 \times \frac{8}{100} = 400$$

13. A cyclic quadrilateral $ABCD$ is shown in the figure. The side AB is produced to E . Moreover, $\angle BCD = 120^\circ$ and $\angle CBE = 70^\circ$. Find the values of x and y according to the given information.

$$x = 70^\circ, y = 60^\circ$$



14. The students in a certain school who study the subjects Art, Dancing and Music are represented by the pie chart. If the number of students who study Music is 45, how many students study Dancing?

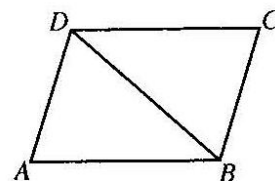


30 _____ ②
Obtaining $60^\circ / \frac{60^\circ}{90^\circ}$ 45 _____ 1

15. Express the sixth term in the geometric progression 9, 27, 81, ... as a power of 3.

3^7 _____ ②
 $9(3)^{6-1} / 3^2 \times 3^5$ _____ 1

16. A parallelogram $ABCD$ is given in the figure. For each statement in the table, if it is correct mark a '✓' in front of it and if it is incorrect mark a '✗' in front of it.



(1)	Area of the triangle $ABD = \frac{1}{2} \times$ area of the parallelogram $ABCD$	✓	_____ 1
(2)	The diagonal DB bisects \hat{ADC} .	✗	_____ 1

②

17. Find the least common multiple of the following three algebraic terms:

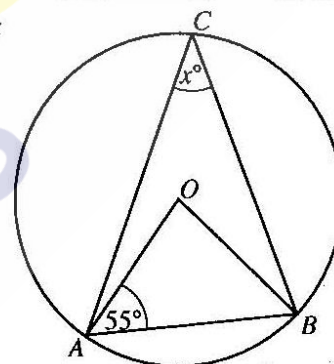
$3x^2$, $6xy$, $2y$ $6x^2y$ _____ ②

$$\left. \begin{array}{l} 3x \quad 3 \quad x \quad x \\ 6xy \quad 3 \quad 2 \times x \quad y \\ 2y \quad 2 \quad y \end{array} \right\} / 3 \quad 2 \quad x \quad x \quad y \text{ _____ 1}$$

18. The centre of the circle in the given figure is O . Find the value of x according to the information indicated in it.

$x = 35$ or 35 _____ ②

$\hat{ABO} = 55^\circ / \hat{AOB} = 70^\circ / \hat{AOB} = 2x$ _____ 1

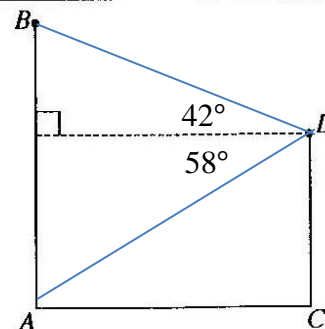


19. Two vertical pillars AB and CD located on a level ground are shown in the figure. When observed from D , the angle of elevation of B is 42° and the angle of depression of A is 58° . Represent this information in the figure.

Marking 42° _____ 1

②

Marking 58° _____ 1



20. A bag contains 35 identical marbles. A certain number of them are white while the rest are black. If the probability of a marble picked randomly from the bag being black is $\frac{5}{7}$, how many black marbles are there in the bag?

$$\frac{5}{7} \times 35 = 25 \quad \text{②}$$

21. Fill in the blanks in the following statement using suitable geometric terms.
 "The straight line joining the centre of a circle to the midpoint of a chord of the circle is perpendicular to the chord". ②

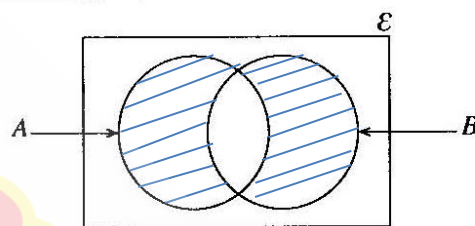
22. Find the value of x if

$$\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix} \begin{pmatrix} 2 & -1 \\ -1 & 1 \end{pmatrix} = \begin{pmatrix} 5 & x \\ -4 & 3 \end{pmatrix}$$

$$x = -2 \text{ or } \begin{pmatrix} 5 & -2 \\ -4 & 3 \end{pmatrix} \quad \text{②}$$

$$3 \quad -1 \quad 1 \quad 1 \quad x \quad \text{①}$$

23. From the group of students who are represented in the given Venn diagram, the set of students who like Mathematics is represented by A and the set of students who like Science is represented by B . In the Venn diagram, shade the regions that represent the students who like only one of these two subjects.



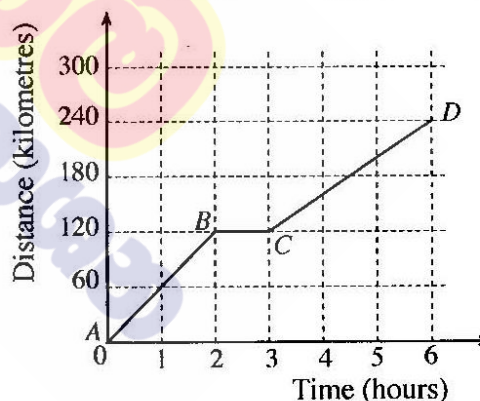
Shading the relevant regions ②

24. A distance-time graph that represents the motion of a motor vehicle is shown in the figure. Which part of the graph represents the motor vehicle travelling with the greater speed? What is this speed?

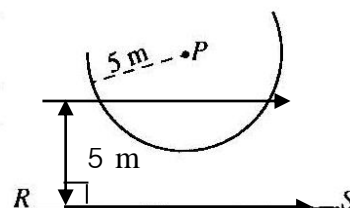
From A to B / Time from 0 to 2 hours /

Distance from 0 to 120 km ①

$$\frac{120}{2} = 60 \text{ kmh}^{-1} \quad \text{②}$$



25. A portion of the locus of a point that moves at a constant distance of 5 m from the given point P is indicated by the arc in this sketch. The straight line RS is at a distance of 7 m from P . Indicate by a sketch on this figure, how the points on the arc which are at a distance of 5 m from the straight line RS also, are found.



Indicating the parallel lines such that they intersect the arc ①

Part B

Answer all questions on this question paper itself.

1. $\frac{7}{15}$ of the total length of a drain was dug on the first day and $\frac{1}{4}$ of the remaining length was dug on the second day.

- (i) At the end of the first day, what fraction of the total length of the drain remained to be dug?

$$1 - \frac{7}{15} = \frac{8}{15} \quad \text{_____} \quad 1 \quad \text{①}$$

- (ii) What fraction of the total length of the drain was dug on the second day?

$$\frac{8}{15} \times \frac{1}{4} = \frac{1}{15} \quad \text{_____} \quad 1 \quad \text{②}$$

- (iii) At the end of the first two days, a further length of 600 metres of the total length of the drain remained to be dug. Find the total length of the drain.

$$\begin{aligned} \text{Remaining fraction} &= 1 - \left(\frac{7}{15} + \frac{1}{15} \right) = \frac{6}{15} \quad \text{_____} \quad 1 \\ \text{Length of drain} &= 600 \times \frac{15}{6} = 1500 \text{ m} \quad \text{_____} \quad 1 \quad \text{④} \end{aligned}$$

- (iv) It has been estimated that 4 men will require 3 days to dig the remaining 600 metres of the drain. How many more men need to be engaged to dig this length in two days?

$$\begin{aligned} \text{Amount of work} &= 4 \times 3 \text{ man days} = 12 \quad \text{_____} \quad 1 \\ \text{Number of men needed for 2 days} &= \frac{12}{2} = 6 \quad \text{_____} \quad 1 \quad \text{③} \\ \therefore \text{Extra men needed} &= 2 \quad \text{_____} \quad 1 \quad \text{⑩} \end{aligned}$$

2. A sheet consists of a portion $ABCD$ in the shape of a trapezium and a semi-circular portion with diameter DC , as shown in the figure. (Take the value of π as $\frac{22}{7}$.)

- (i) It has been decided to attach small buttons along the edge of the semi-circular portion, starting from D and ending at C , such that the distance between every two adjacent buttons is 2 cm. How many buttons are required for this?

$$\begin{aligned} \text{Arc length of } CD &= \frac{22}{7} \times \frac{14}{2} = 22 \text{ cm} \quad \text{_____} \quad 1 \end{aligned}$$

$$\therefore \text{Number of gaps} = \frac{22}{2} = 11 \quad \text{_____} \quad 1$$

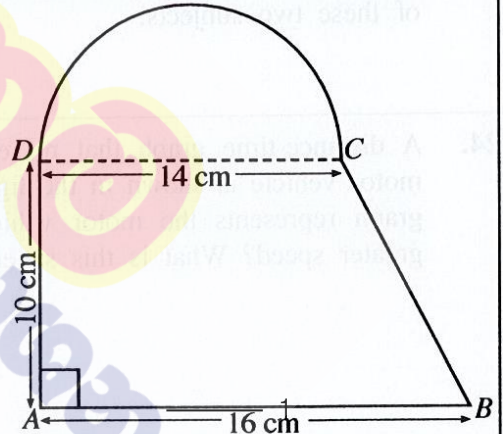
$$\text{Number of buttons} = 11 + 1 = 12 \quad \text{_____} \quad 1 \quad \text{④}$$

- (ii) Calculate the total area of the sheet.

$$\begin{aligned} \text{Total Area} &= \frac{1}{2} \times (14 + 16) \times 10 + \frac{1}{2} \times \pi \times 7^2 \\ &= 150 + 154 = 304 \text{ cm}^2 \quad \text{_____} \quad 1 \quad \text{④} \end{aligned}$$

- (iii) If a rectangular sheet is made with its area equal to the area of the semi-circular portion and its length equal to the length of AD , then find its breadth.

$$\begin{aligned} \text{Breadth} &= \frac{154}{10} = 15.4 \text{ cm} \quad \text{_____} \quad 1 \quad \text{②} \end{aligned}$$



3. Kumara runs a business within an urban council limits.

(a) The assessed annual value of his business place is 40 000 rupees. The urban council charges annual rates of 22%.

(i) Find the amount that has to be paid annually as rates.

$$\begin{aligned} \text{Rates} &= \text{Rs. } 40\,000 \times \frac{22}{100} = \text{Rs. } 8\,800 \end{aligned} \quad \text{②}$$

(ii) How much does he have to pay as rates for a quarter?

$$\begin{aligned} \text{Rates for a quarter} &= \text{Rs. } \frac{8\,800}{4} = \text{Rs. } 2\,200 \end{aligned} \quad \text{②}$$

(b)

	Annual income (rupees)	Income tax percentage
Initial	500 000	tax free
Next	500 000	4%
Next	500 000	8%

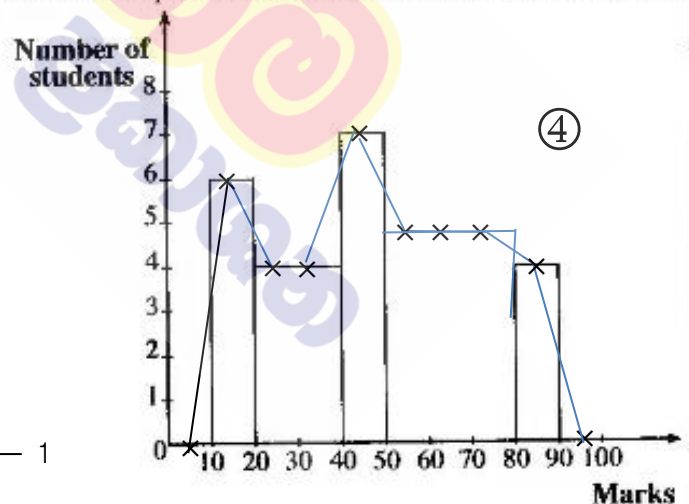
Kumara pays 12 000 rupees as income tax for a year, based on the above table. What is his annual income?

$$\begin{aligned} \text{Income on which tax is charged} &= \text{Rs. } \frac{12\,000 \times 100}{4} = \text{Rs. } 300\,000 \end{aligned} \quad \text{⑥}$$

$$\begin{aligned} \text{Annual Income} &= \text{Rs. } 500\,000 + 300\,000 = \text{Rs. } 800\,000 \end{aligned} \quad \text{⑩}$$

4. The following incomplete frequency distribution and corresponding incomplete histogram have been prepared using the marks obtained in a test by 40 students in a class. Here 10 – 20 denotes the marks interval "greater than 10 and less than or equal to 20", and the other intervals denote similarly.

Marks	Number of students
10 – 20	6
20 – 40	8
40 – 50	7
50 – 80	15
80 – 90	4
Total	40



For the column 50 – 80 ——— 1

(i) Complete the above frequency table and histogram.

(ii) Express the number of students who obtained more than 40 marks as a percentage of the total number of students. ——— 1

$$\frac{26}{40} \times 100\% = 65\% \quad \text{③}$$

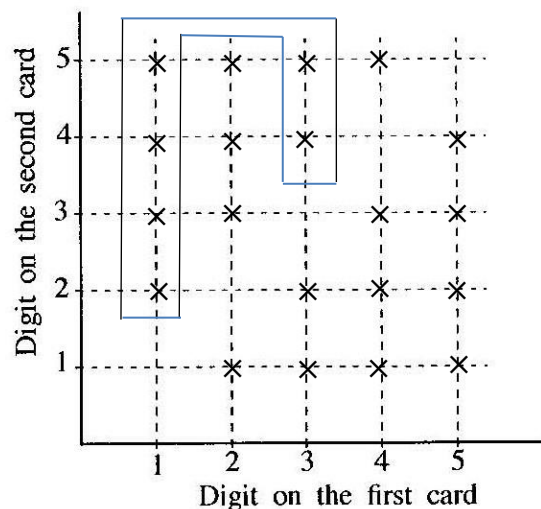
(iii) Draw the frequency polygon on the histogram. For the two end points ——— 1 + 1

For the correct polygon ——— 1 ⑩

5. (a) It is given that the first two symbols of a certain password are two different digits from the digits 1, 2, 3, 4, 5. To choose the first digit of the password, a student randomly picks a card from five identical cards on each of which one of these digits is written. Then, **without replacing** it, he randomly picks another card to choose the second digit.

- (i) Using the symbol 'x', mark the sample space of the two digits on the cards that the student randomly picks, on the given grid.

For correctly marking _____ ①



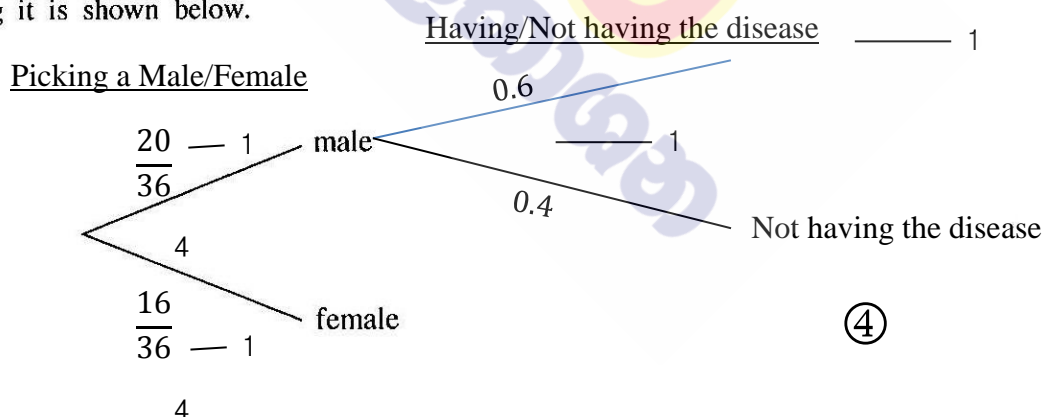
- (ii) It was later discovered that the first digit which was obtained for the password was odd and that this digit was less than the second digit that was obtained. Indicate the event that satisfies these conditions on the sample space and obtain its probability.

For indicating the event _____ 1
 $\frac{6}{10}$ or $\frac{3}{5}$ _____ 1

②

- (b) During a period when a certain disease was spreading, 20 males and 16 females who displayed the symptoms of this disease arrived to obtain medication from a physician. Although all the females actually had the disease, the probability of a person picked at random from among the males actually having the disease was 0.6.

A portion of a tree diagram drawn to indicate the probabilities of a person picked at random from all these people, being a male or a female and being a person having the disease or not having it is shown below.



- (i) Complete the tree diagram by indicating all the relevant probabilities.
- (ii) Find the probability of a person picked at random being a person having the disease.

$\frac{20}{36}$ 0.6 $\frac{16}{36}$ 1 _____ 1 + 1
 or 4 $\frac{7}{9}$ _____ 1

③

Answer *five* questions only.

Bank A	Company B
An interest of 9% per annum is paid for fixed deposits.	Price of a share is 25 rupees and dividends of 1.50 rupees per share is paid annually.

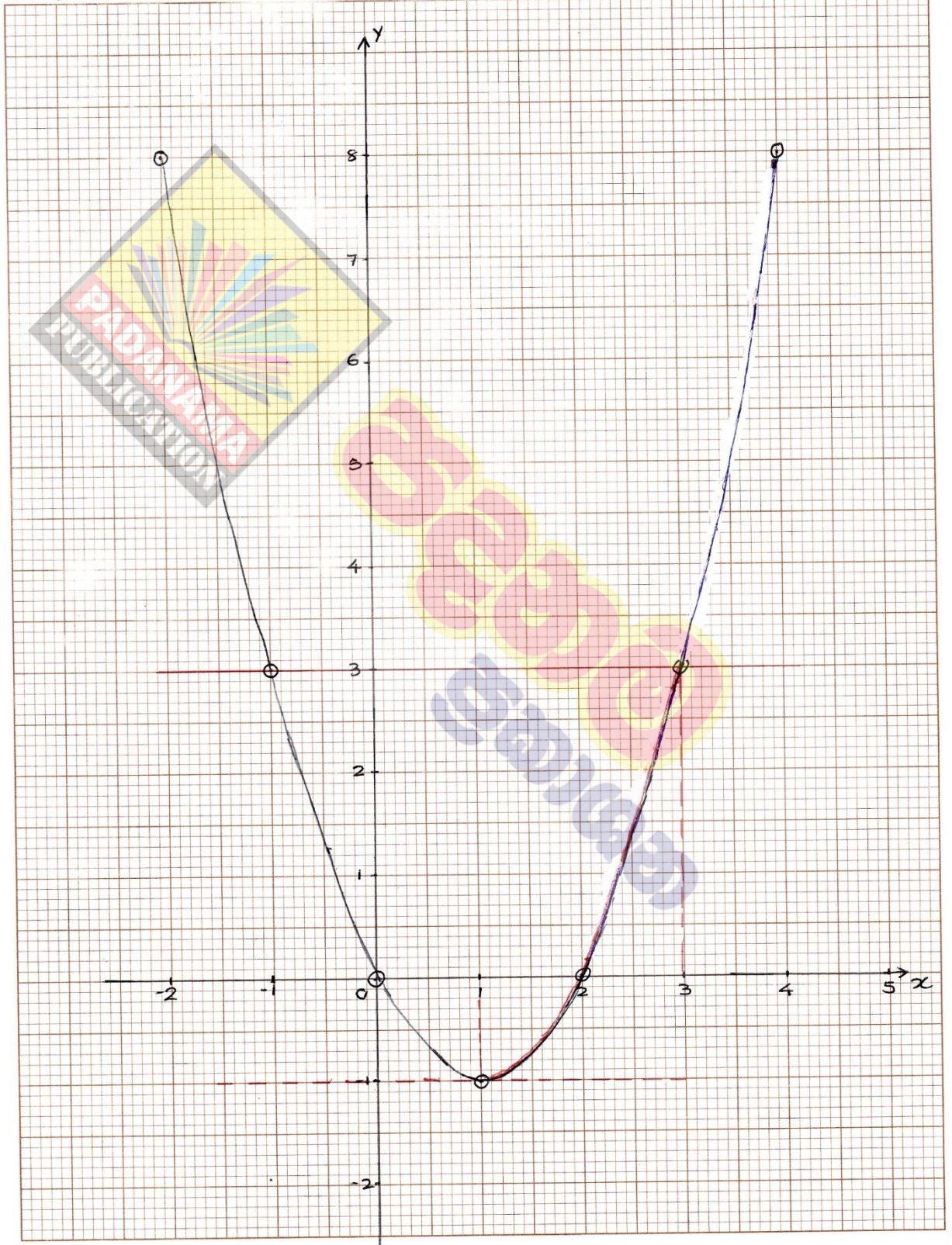
- (i) Kamal deposited exactly half of the amount of 100 000 rupees he had in a fixed deposit in Bank A and spent the remaining amount in buying shares in Company B. At the end of a year he obtains the dividends from Company B and sells all the shares at 26 rupees per share. Show giving reasons, from which investment he receives a greater income at the end of a year.
- (ii) Express the total income he receives at the end of a year as a percentage of the total amount invested.

No.	Marking Scheme	Mark
(i)	Interest from Bank A at the end of a year $= \text{Rs. } 50\,000 \times \frac{9}{100}$ $= \text{Rs. } 4\,500$ Number of shares of Company B = $\frac{50\,000}{25}$ $= 2\,000$ Dividend income = $2\,000 \times \text{Rs. } 1.50$ $= \text{Rs. } 3\,000$ Capital gain = $\text{Rs. } 2\,000 \times 26 - \text{Rs. } 50\,000$ $= \text{Rs. } 2\,000$ Total income from Company B $= \text{Rs. } 3\,000 + \text{Rs. } 2\,000$ $= \text{Rs. } 5\,000$ Since $\text{Rs. } 5\,000 > \text{Rs. } 4\,500$ a greater income is obtained from the investment in Company B.	1 1 1 1 1 1 1 1
(ii)	Total income obtained at the end of a year	1

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
இலங்கைப் பரீட்சைத் திணைக்களம்
Department Of Examinations, Sri Lanka

විභාගය / பரீட்சை / Exam		විෂයය / பாடம் / Subject	
ප්‍රශ්න අංකය / வினா இலக்கம் / Question No.		විභාග අංකය / கட்டுண்ண / Index No.	

විභාග ශාලාවේ පිටතට ගෙන යාම තහනම්. පරීட்சා ශාලාවට පත්වීමට වෙනම තහනම්. පරීட்சා ශාලාවට පත්වීමට වෙනම තහනම්. Not to be removed from the Examination Hall.



2. An incomplete table showing the y -values corresponding to several x -values of the quadratic function $y = x^2 - 2x$, within the interval $-2 \leq x \leq 4$, is given below.

x	-2	-1	0	1	2	3	4
y	8	3	0	-1	0	...	8

- Find the value of y when $x = 3$.
- Using the standard system of axes and a suitable scale, draw the graph of the given quadratic function on a graph paper, according to the above table of values.
- Write the coordinates of the turning point of the graph.
- Express the given quadratic function in the form $y = (x-a)^2 + b$. Here, a and b are two numbers.
- Write the interval of values of x on which the function increases within the interval $-1 < y \leq 3$.

Question No.	Marking Scheme	Marks	Other facts
2	<p>(i) $y = 3$ when $x = 3$</p> <p>(ii) Correct axes Marking at least 6 points correctly Smooth curve</p> <p>(iii) $(1, -1)$</p> <p>(iv) $y = (x - 1)^2 - 1$</p> <p>(v) $1 < x < 3$ or greater than 1 and less than or equal to 3</p>	<p>1</p> <p>1</p> <p>1</p> <p>2</p> <p>1+1</p> <p>2</p> <p>10</p> <p>10</p>	<p>For obtaining both $a = 1$ and $b = -1$ 1 mark</p> <p>$1 < x$ or $x \leq 3$ or 1 and 3 1 mark</p>

3. (a) There are 5 boys and 4 girls in a group of dancers. In a certain performance, all the boys wore costumes of the same price and all the girls too wore costumes of the same price. The price of two boys' costumes was 1000 rupees more than the price of three girls' costumes. The cost of the costumes of all the children in the group was 14 000 rupees.
- (i) Take the price of a boy's costume as x rupees and the price of a girl's costume as y rupees and construct a pair of simultaneous equations that represents the above information.
- (ii) By solving these equations, find separately the price of a boy's costume and the price of a girl's costume.
- (b) Simplify: $\frac{5x}{x^2-1} - \frac{4}{x+1}$

[illegible]

-

Question No.	Marking Scheme	Marks	Other facts
4	<p>Area of the semicircular lamina $A = - (x)^2$</p> <p>Area of the lamina B in the shape of a sector</p> $= \frac{1}{6} \pi (x + 4)^2$ <p>$-\frac{1}{6} (x + 4)^2 = - (x)^2$</p> $x^2 + 8x + 16 = 3x^2$ $2x^2 - 8x - 16 = 0$ $x^2 - 4x - 8 = 0$ $(x - 2)^2 = 8 + 4$ $x - 2 = \pm 2\sqrt{3}$ $x = 2 + 2\sqrt{3} \quad \text{or} \quad 2 - 2\sqrt{3}$ $2 - 2\sqrt{3} < 0$ <p>x can take only one value. It is $x = 2 + 2\sqrt{3}$</p> $x = 2 + 2(1.73)$ $= 5.46 \text{ units}$ <p>Radius of the sector</p> $= 4 + 5.46$ $= 9.5 \text{ units}$	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>$x = \frac{4 \pm \sqrt{16 - 4 \times 8}}{2}$</p> <p>$x = 2 \pm 2\sqrt{3}$</p>

-

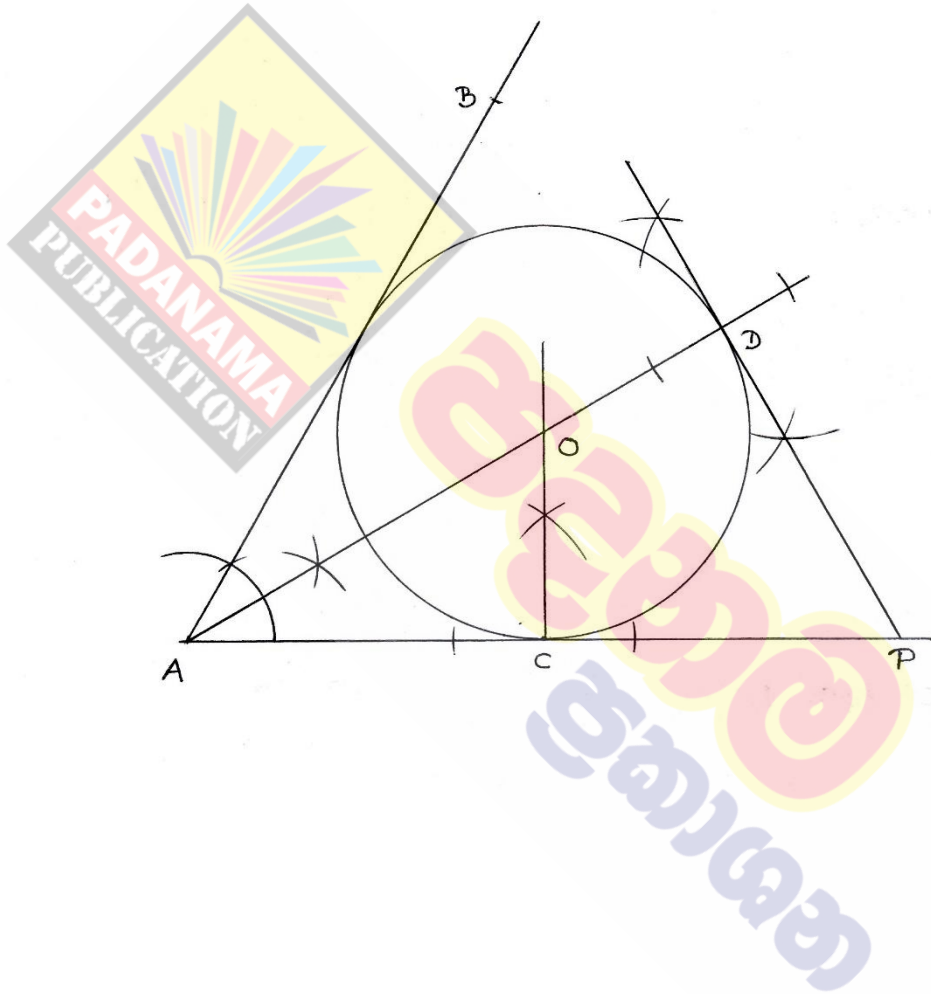
- | Question No. | Marking Scheme | Marks | Other facts |
|--------------|--|--|-------------|
| 5 | <p>(i)</p> <p>Marking 90°
Marking 127° or 100 m</p> <p>(ii)</p> <p>$\cos 53^\circ = \frac{AB}{100}$
 $AB = 100 \times 0.6018$
 $AB = 60.18$
 $AB \approx 60 \text{ m}$</p> <p>(iii)</p> <p>Marking <i>D</i> and <i>E</i> correctly
 $\tan \angle AEB = \frac{AB}{EB}$
 $\tan \angle AEB = 3.933$
 $\angle AEB = 75^\circ 44'$</p> | <p>1
1</p> <p>2</p> <p>1
1
1
1</p> <p>4</p> <p>1
1
1
1</p> <p>4</p> <p>10
10</p> | |

- | | | | | | | | |
|-----------------------------|--------|---------|---------|---------|---------|---------|---------|
| Mass of a bag of items (kg) | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 | 50 – 60 | 60 – 70 |
| Number of bags (frequency) | 2 | 5 | 7 | 9 | 8 | 6 | 3 |

- | Question No. | Marking Scheme | Marks | Other facts | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|---|----------------|---------------|---------------|------|--------|---|---|----|---------|---|----|----|---------|---|----|-----|---------|---|----|-----|---------|---|----|-----|---------|---|----|-----|---------|---|----|-----|--|----|--|------|--|---|
| 6 | <p>(i)</p> <table border="1"> <thead> <tr> <th>Class Interval</th><th>Frequency f</th><th>Mid value x</th><th>fx</th></tr> </thead> <tbody> <tr><td>0 - 10</td><td>2</td><td>5</td><td>10</td></tr> <tr><td>10 - 20</td><td>5</td><td>15</td><td>75</td></tr> <tr><td>20 - 30</td><td>7</td><td>25</td><td>175</td></tr> <tr><td>30 - 40</td><td>9</td><td>35</td><td>315</td></tr> <tr><td>40 - 50</td><td>8</td><td>45</td><td>360</td></tr> <tr><td>50 - 60</td><td>6</td><td>55</td><td>230</td></tr> <tr><td>60 - 70</td><td>3</td><td>65</td><td>195</td></tr> <tr><td></td><td>40</td><td></td><td>1460</td></tr> </tbody> </table> <p>Column x
Column fx (Disregard one error)</p> $\sum fx$ <p>Mean mass = —</p> $= \frac{1460}{40}$ $= 36.5 \text{ kg}$ <p>(ii) Mass of 200 bags = $36.5 \text{ kg} \times 200$
= 7300 kg</p> <p>(iii) Maximum possible mass of the 40 bags
= $10 \times 2 + 20 \times 5 + 30 \times 7 + 40 \times 9 + 50 \times 8$
 $\begin{matrix} 60 & 6 & 70 & 3 \end{matrix}$
 = 1660 kg</p> <p>Since $1660 \text{ kg} > 1500 \text{ kg}$ there can be instances when these 40 bags cannot be loaded into the lorry.</p> | Class Interval | Frequency f | Mid value x | fx | 0 - 10 | 2 | 5 | 10 | 10 - 20 | 5 | 15 | 75 | 20 - 30 | 7 | 25 | 175 | 30 - 40 | 9 | 35 | 315 | 40 - 50 | 8 | 45 | 360 | 50 - 60 | 6 | 55 | 230 | 60 - 70 | 3 | 65 | 195 | | 40 | | 1460 | <p>1
2
1
1
1
1
1
1
2
10
10</p> | <p>Column d
Column fd</p> |
| Class Interval | Frequency f | Mid value x | fx | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 - 10 | 2 | 5 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 - 20 | 5 | 15 | 75 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 - 30 | 7 | 25 | 175 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 - 40 | 9 | 35 | 315 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 - 50 | 8 | 45 | 360 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 - 60 | 6 | 55 | 230 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 - 70 | 3 | 65 | 195 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 40 | | 1460 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

7. Sunitha who hopes to participate in a sports event trains by jogging daily. She spends 105 minutes in the first week and 119 minutes in the second week for this. The time she spends training each week when taken consecutively, lie in an arithmetic progression.
- Find the common difference of this arithmetic progression.
 - Find in minutes, the time she spends training in the 7th week.
 - In which week does the time she spends training during a week first exceed 221 minutes?
 - Find the total time she spends jogging during the first 10 weeks of training.
 - If the average speed at which she jogs is 6 km h^{-1} , find the total distance she jogs during that time.

Question No.	Marking Scheme	Marks	Other facts
7	<p>(i) Common Difference = $119 - 105 = 14$</p> <p>(ii) $a = 105, d = 14, n = 7$</p> $T_n = a + (n - 1) d$ $T_7 = 105 + (7 - 1) 14$ $= 105 + 6 \times 14$ $= 105 + 84$ $= 189 \text{ minutes}$ <p>(iii) $T_n = a + (n - 1) d$</p> $221 < 105 + (n - 1) 14$ $\frac{116}{14} < n - 1$ $n > 9.28$ <p>In the 10th week .</p> <p>(iv) (a) $a = 105, n = 10, d = 14$</p> $S_n = \frac{n}{2} \{2a + (n - 1)d\}$ $= \frac{10}{2} \{2 \times 105 + (10 - 1)14\}$ $= 5 \{210 + 126\}$ $= 5 \times 336$ $= 1680 \text{ minutes}$ <p>(b) Distance jogged = $\frac{6}{60} \times 1680$</p> $= 168 \text{ km}$	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>1</p> <p>2</p> <p>3</p> <p>4</p> <p>10</p> <p>10</p>



8. Use only a straight edge with a cm/mm scale and a pair of compasses for the following constructions. The construction lines should be drawn clearly.
- Construct a straight line segment AC of length 6 cm and construct the line AB such that $\hat{CAB} = 60^\circ$.
 - Construct the angle bisector of \hat{CAB} .
 - Construct the circle that has its centre O on the above constructed angle bisector and touches AC at C . Produce the line AO such that it meets the circle at D .
 - Construct the tangent to the circle at D and mark the point of intersection of this tangent and AC produced as P .
 - Give reasons why $\hat{DPC} = \hat{AOC}$.

Question No.	Marking Scheme	Marks			Other facts
8	<p>(i) The straight line segment $AC = 6$ cm $\hat{CAB} = 60^\circ$</p> <p>(ii) Angle bisector of \hat{CAB}</p> <p>(iii) Obtaining the centre Constructing the circle Obtaining D</p> <p>(iv) Constructing the tangent at D</p> <p>(v) $\hat{OCP} = \hat{ODP} = 90^\circ$ $OCPD$ is a cyclic quadrilateral. $\hat{DPC} = \hat{AOC}$ (The exterior angle of a cyclic quadrilateral is equal to the interior opposite angle)</p>	<p>1 1</p> <p>2</p> <p>1 1 1</p> <p>1</p> <p>1 1</p>	<p>2</p> <p>2</p> <p>3</p> <p>1</p> <p>2</p>	<p>10</p> <p>10</p>	

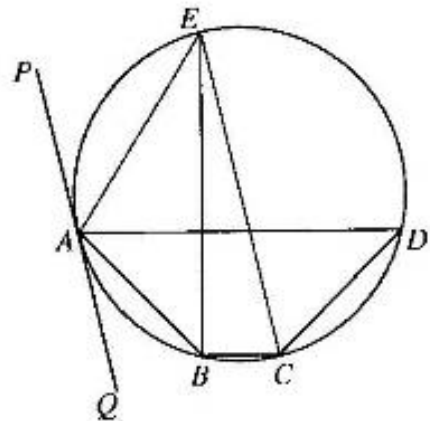
-

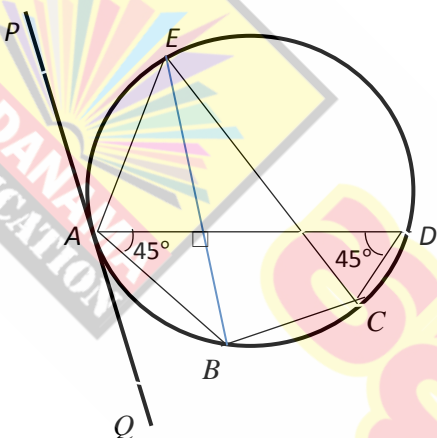
(iii) The lines PX and QY produced meet at D . If $DX = XP$, show that $XY = \frac{1}{2}PQ$.

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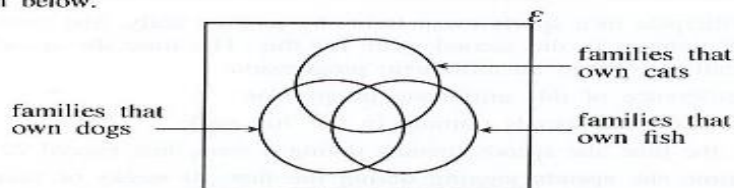
10. In the cyclic quadrilateral $ABCD$ shown in the figure, $\angle DAB = \angle ADC = 45^\circ$. The straight line drawn from B perpendicular to AD meets the circle at E . The line PAQ is the tangent drawn to the circle at A .

Prove that CE is a diameter of the circle and that it is parallel to the tangent PAQ .



Question No.	Marking Scheme	Marks	Other facts
10	 <p> $\angle ABE = 90^\circ - 45^\circ$ $= 45^\circ$ (Sum of the interior angles of a Δ.) </p> <p> $\angle ABC + \angle ADC = 180^\circ$ (Opposite angles of the cyclic quadrilateral $ABCD$ are supplementary.) $\angle ABC = 135^\circ$ </p> <p> $\angle ABC = \angle ABE + \angle EBC$ $135^\circ = 45^\circ + \angle EBC$ $\angle EBC = 90^\circ$ </p> <p> $\therefore CE$ is a diameter. (Angle in a semicircle is 90°.) </p> <p> $\angle ABC + \angle AEC = 180^\circ$ (Opposite angles of the cyclic quadrilateral $ABCE$ are supplementary.) $\angle AEC = 45^\circ$ </p> <p> $\therefore \angle PAE = 45^\circ$ (Angles in the same segment) $\therefore \angle PAE = \angle AEC = 45^\circ$ $\therefore CE \parallel PAQ$ (Since alternate angles are equal) </p>	<p>1</p> <p>1+1</p> <p>1</p> <p>1</p> <p>1+1</p> <p>1+1</p> <p>1</p>	<p>10</p>

11. A survey was conducted on 115 families that own pets. Information on the families that own dogs, cats and fish as pets from these families and an incomplete Venn diagram drawn corresponding to it are given below.

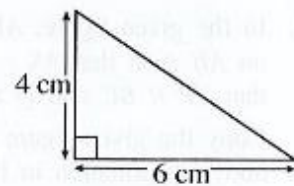


- 4 families own all the above three types of pets.
- The number of families that own only dogs is 19.
- 24 families own both dogs and cats while 21 families own both dogs and fish.
- 11 families do not own any of the above three types of pets.

- Copy the given Venn diagram onto your answer script and include the above information in it.
- The number of families that own dogs is twice the number of families that own fish. Find the number of families that own fish but **do not** own dogs.
- How many families own only cats?
- The number of families that own only fish is twice the number of families that own cats and fish but **not** dogs. Find the probability of a family selected at random from those surveyed being a family that owns only fish.

Question No.	Marking Scheme	Marks	Other facts
11	<p>(i)</p> <p>Marking at least two of 4, 19, 11, 115 in the correct regions Obtaining 20 Obtaining 17</p> <p>(ii) Number of families that own dogs = $24 + 17 + 19$ $= 60$ \therefore Number of families that own fish but not dogs $= 30 - 21$ $= 9$</p> <p>(iii) Number of families that own only cats $= 115 - (60 + 9 + 11)$ $= 35$</p> <p>(iv) Number of families that own only fish = 9 $= 6$ Probability of being a family that owns only fish = $\frac{6}{115}$</p>	<p>2 1 1 1 1 1 1</p> <p>4 3 1 2</p> <p>10 10</p>	<p>Marking in two regions correctly - 2 Marking in one region correctly - 1</p>

12. A hemispherical container of radius r is completely filled with water. This water is poured into a glass container in the shape of a prism, having a triangular cross section with the measurements shown in the figure, such that no water spills out. Then the water fills this glass container to a height of 10 cm. Show that the radius r of the hemispherical container is obtained by $r = \sqrt[3]{\frac{180}{\pi}}$ cm, and taking the value of π as 3.14, find the value of r in centimetres to the first decimal place.



Question No.	Marking Scheme	Marks	Other facts
12	<p>Volume of water in the hemispherical container</p> $= -\left(\frac{4}{3}\right)$ <p>Volume of water in the prism shaped container</p> $= \frac{4 \times 6 \times 10}{3}$ $= \frac{4 \times 6}{4}$ $= \frac{180}{4}$ $\therefore r = \sqrt[3]{\frac{180}{4}} \text{ cm}$ <p>$\log r = \frac{1}{3} [\log 180 - \log 4]$</p> <p>$= \frac{1}{3} [2.2553 - 0.4969]$</p> <p>$= \frac{1}{3} [1.7584]$</p> <p>$= 0.5861$</p> <p>$r = \text{antilog}(0.5861)$</p> <p>$r = 3.855$</p> <p>$r = 3.9 \text{ cm}$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1+1</p> <p>1</p> <p>1</p> <p>1</p>	<p>10</p> <p>10</p>

10 සහ 11 ශ්‍රේණි සඳහා ග්‍රන්ථ නාමාවලිය

(අ.පො.ස) සාමාන්‍ය පෙළ 11 ශ්‍රේණිය - කෙටි සටහන්

සිංහල මාධ්‍ය

<input type="checkbox"/>	10-11 සිංහල ව්‍යාකරණ
<input type="checkbox"/>	10-11 සිංහල සාහිත්‍යය රසාස්වාදය
<input type="checkbox"/>	බුද්ධ ධර්මය
<input type="checkbox"/>	කතෝලික ධර්මය
<input type="checkbox"/>	සිංහල භාෂාව හා සාහිත්‍යය
<input type="checkbox"/>	සිංහල සාහිත්‍යය සංග්‍රහය
<input type="checkbox"/>	English Language
<input type="checkbox"/>	ගණිතය - 1
<input type="checkbox"/>	ගණිතය - 2
<input type="checkbox"/>	ජීව විද්‍යාව
<input type="checkbox"/>	භෞතික විද්‍යාව
<input type="checkbox"/>	රසායන විද්‍යාව
<input type="checkbox"/>	ඉතිහාසය
<input type="checkbox"/>	ව්‍යාපාර හා ගිණුම්කරණ අධ්‍යයනය
<input type="checkbox"/>	භූගෝල විද්‍යාව
<input type="checkbox"/>	පුරවැසි අධ්‍යාපනය
<input type="checkbox"/>	පෙරදිග සංගීතය
<input type="checkbox"/>	නර්තනය
<input type="checkbox"/>	නාට්‍ය හා රංග කලාව
<input type="checkbox"/>	චිත්‍ර කලාව
<input type="checkbox"/>	තොරතුරු හා සන්නිවේදන තාක්ෂණය
<input type="checkbox"/>	සන්නිවේදනය හා මාධ්‍ය අධ්‍යයනය
<input type="checkbox"/>	සෞඛ්‍යය හා ශාරීරික අධ්‍යාපනය
<input type="checkbox"/>	කෘෂි හා ආහාර තාක්ෂණය
<input type="checkbox"/>	ගෘහ ආර්ථික විද්‍යාව

11 ශ්‍රේණිය - ප්‍රශ්නෝත්තර

සිංහල මාධ්‍ය

<input type="checkbox"/>	සිංහල භාෂාව හා සාහිත්‍යය
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<input type="checkbox"/>	ඉතිහාසය
<input type="checkbox"/>	ව්‍යාපාර හා ගිණුම්කරණ අධ්‍යයනය
<input type="checkbox"/>	පුරවැසි අධ්‍යාපනය

Grade 11 - Short Notes

English Medium

<input type="checkbox"/>	Buddhism
<input type="checkbox"/>	Mathematics - 1
<input type="checkbox"/>	Mathematics - 2
<input type="checkbox"/>	Biology
<input type="checkbox"/>	Physics
<input type="checkbox"/>	Chemistry
<input type="checkbox"/>	History
<input type="checkbox"/>	Business & Accounting Studies
<input type="checkbox"/>	Geography
<input type="checkbox"/>	Civic Education
<input type="checkbox"/>	ICT
<input type="checkbox"/>	Health & Physical Education
<input type="checkbox"/>	10-11 English Literary (Poetry)
<input type="checkbox"/>	10-11 English Literary (Drama)
<input type="checkbox"/>	10-11 English Literary (Short Story)

Grade 11 - Model Papers

English Medium

<input type="checkbox"/>	Civic Education
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10 ශ්‍රේණිය - කෙටි සටහන්

සිංහල මාධ්‍ය

<input type="checkbox"/>	බුද්ධ ධර්මය
<input type="checkbox"/>	කතෝලික ධර්මය
<input type="checkbox"/>	සිංහල භාෂාව හා සාහිත්‍යය
<input type="checkbox"/>	සිංහල සාහිත්‍යය සංග්‍රහය
<input type="checkbox"/>	සිංහල රචනා අත්වැල
<input type="checkbox"/>	English Language
<input type="checkbox"/>	ගණිතය - 1
<input type="checkbox"/>	ගණිතය - 2
<input type="checkbox"/>	ජීව විද්‍යාව
<input type="checkbox"/>	භෞතික විද්‍යාව
<input type="checkbox"/>	රසායන විද්‍යාව

Grade 10 - Short Notes

English Medium

<input type="checkbox"/>	ඉතිහාසය
<input type="checkbox"/>	ඉතිහාසය රූප සටහන් අග්‍රිත කෙටි සටහන්
<input type="checkbox"/>	ව්‍යාපාර හා ගිණුම්කරණ අධ්‍යයනය - 1
<input type="checkbox"/>	ව්‍යාපාර හා ගිණුම්කරණ අධ්‍යයනය - 2
<input type="checkbox"/>	භූගෝල විද්‍යාව
<input type="checkbox"/>	පුරවැසි අධ්‍යාපනය
<input type="checkbox"/>	පෙරදිග සංගීතය
<input type="checkbox"/>	නර්තනය
<input type="checkbox"/>	නාට්‍ය හා රංග කලාව
<input type="checkbox"/>	චිත්‍ර කලාව
<input type="checkbox"/>	තොරතුරු හා සන්නිවේදන තාක්ෂණය
<input type="checkbox"/>	සන්නිවේදනය හා මාධ්‍ය අධ්‍යයනය
<input type="checkbox"/>	සෞඛ්‍යය හා ශාරීරික අධ්‍යාපනය
<input type="checkbox"/>	කෘෂි හා ආහාර තාක්ෂණය
<input type="checkbox"/>	ගෘහ ආර්ථික විද්‍යාව
<input type="checkbox"/>	ජපන් භාෂාව

<input type="checkbox"/>	Buddhism
<input type="checkbox"/>	Mathematics - 1
<input type="checkbox"/>	Mathematics - 2
<input type="checkbox"/>	Biology
<input type="checkbox"/>	Physics
<input type="checkbox"/>	Chemistry
<input type="checkbox"/>	History
<input type="checkbox"/>	Business & Accounting Studies - 1
<input type="checkbox"/>	Business & Accounting Studies - 2
<input type="checkbox"/>	Geography
<input type="checkbox"/>	Civic Education
<input type="checkbox"/>	ICT
<input type="checkbox"/>	Health & Physical Education

10 ශ්‍රේණිය - ප්‍රශ්නෝත්තර

සිංහල මාධ්‍ය

<input type="checkbox"/>	සිංහල භාෂාව හා සාහිත්‍යය
<input type="checkbox"/>	බුද්ධ ධර්මය
<input type="checkbox"/>	ගණිතය
<input type="checkbox"/>	විද්‍යාව
<input type="checkbox"/>	ඉතිහාසය
<input type="checkbox"/>	පුරවැසි අධ්‍යාපනය
<input type="checkbox"/>	භූගෝල විද්‍යාව
<input type="checkbox"/>	පෙරදිග සංගීතය

Grade 10 - Model Papers

English Medium

<input type="checkbox"/>	Mathematics
<input type="checkbox"/>	Science
<input type="checkbox"/>	Civic Education
<input type="checkbox"/>	Geography
<input type="checkbox"/>	English Activity Book
<input type="checkbox"/>	English Work Book

අනෙකුත් ග්‍රන්ථ

<input type="checkbox"/>	හෙළදිව කතිකාවත - අරුණශාන්ත අමරසිංහ
<input type="checkbox"/>	නොල්මන් අවතාර සහ යකඳුරන් - අරුණශාන්ත අමරසිංහ
<input type="checkbox"/>	සිසු-ගුරු අත්පොත නාට්‍ය හා රංග කලාව 10-11 ශ්‍රේණි සඳහා (නව විෂය නිර්දේශය) - තන්දන අල්ගේවත්ත

පාඩමෙන් පාඩමට මාසික ඇගයීම්

සිංහල මාධ්‍ය

<input type="checkbox"/>	10-ශ්‍රේණිය - විද්‍යාව
<input type="checkbox"/>	11-ශ්‍රේණිය - විද්‍යාව

සියලු ම ශ්‍රේණි සඳහා කෙටි සටහන්, ප්‍රශ්න පත්‍ර කට්ටල සහ වැඩ පොත් අප සතුව තිබෙන අතර, මෙම ඕනෑම ග්‍රන්ථයක් වට්ටම් සහිත ව ඔබේ නිවසට ම ගෙන්වා ගත හැකි ය.