

පැරණි තීර්දේශය/பழைய பாடத்திட்டம்/Old Syllabus

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව
 இலங்கைப் பரட்சைத் திணைக்களம் இலங்கைப் பரட்சைத் திணைக்களம் இலங்கைப் பரட்சைத் திணைக்களம் இலங்கைப் பரட்சைத் திணைக்களம் இலங்கைப் பரட்சைத் திணைக்களம்
 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
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අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2017 දෙසැම්බර්
 கல்விப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2017 டிசெம்பர்
 General Certificate of Education (Ord. Level) Examination, December 2017

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**
 1 mark for each question from 1 to 10.
 2 marks for each question from 11 to 30.
 In **Part B**
 10 marks for each question.
- * Blank papers can be obtained for scratch work from an invigilator on request.

For Marking Examiners' Use Only

Part	Question Numbers	Marks
A	1 - 10	
	11 - 30	
B	1	
	2	
	3	
	4	
	5	
Total		

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

[see page two]

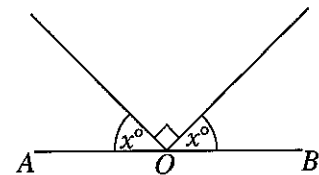
Part A*Answer all questions on this question paper itself.*

1. The price of a certain book is 42 rupees. Find the price of 5 such books.

2. Express 3.2 kilometres in metres.

3. Simplify: $\frac{5}{7} - \frac{1}{7}$

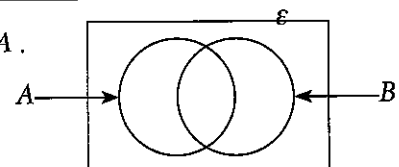
4. In the figure, AOB is a straight line. Find the value of x , using the given information.



5. Solve: $x + 3 = 5$

6. There are 7 white balls and 2 black balls in a basket. These balls are of the same size. What is the probability that a ball picked at random from this basket is a black ball?

7. In the given Venn diagram, shade the region representing $B' \cap A$.



8. Make A the subject of $P = A(1 + rt)$.

9. Find the value: $\frac{1}{2^{-1}}$

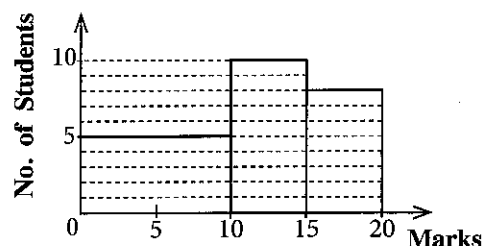
10. Fill in the blank:

$$11_{\text{two}} + 10_{\text{two}} = \dots\dots\dots \text{two}$$

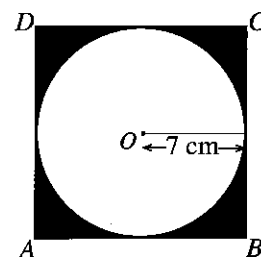
[see page three]

11. It has been estimated that 6 men will require 5 days to build a certain wall. How many men are needed to build this wall in 3 days?

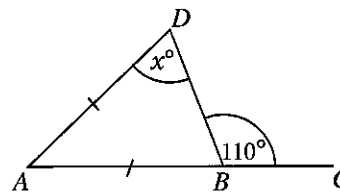
12. A histogram representing the marks obtained by the students of a certain class in a mathematics test is given in the figure. Find the total number of students in this class. (Here, the number of students in the class interval 10 - 15 is 10)



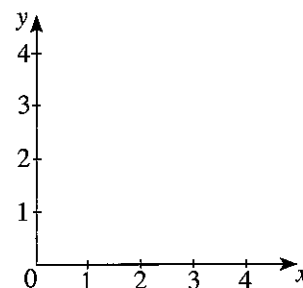
13. In the figure, the radius of the circle inscribed in the square $ABCD$ is 7 cm. Find the sum of the areas of the shaded regions in square centimetres. (Use $\frac{22}{7}$ for the value of π .)



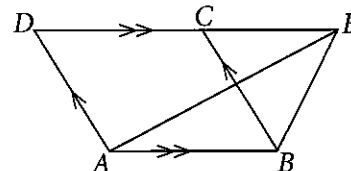
14. In the figure, ABC is a straight line. Find the value of x , using the given information.



15. On the given coordinate plane, draw the straight line given by $y = 3 - x$.



16. The area of $\triangle ABE$ in the figure is 6 cm^2 . Using the given information, find the area of the parallelogram $ABCD$ in square centimetres.



17. The volume of a sphere of radius 5 cm is equal to the volume of a right circular cone of base radius 5 cm. Find the height of the cone in centimetres.

(The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$ and the volume of a right circular cone of base radius r and height h is $\frac{1}{3}\pi r^2 h$.)

[see page four]

18. A man deposits 1000 rupees for 2 years in a bank which pays interest for fixed deposits at a rate of 10% compounded annually. Find the amount of interest that is paid for the second year.

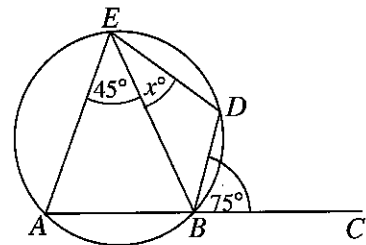
19. Find x and y : $\begin{pmatrix} 1 \\ 2 \end{pmatrix} + 2\begin{pmatrix} 0 \\ y \end{pmatrix} = \begin{pmatrix} x \\ 0 \end{pmatrix}$

20. Water is pumped into an empty water tank of volume 352 m^3 at a uniform rate of 32 cubic metres per hour. Find the time in hours that it takes to fill the tank completely.

21. Find the range and the median of the group of data given below.

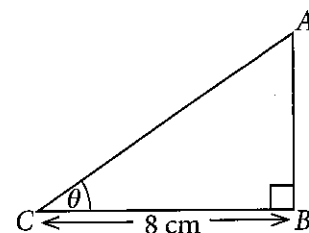
10, 11, 14, 18, 24, 27, 29

22. The points A , B , D and E lie on the circle shown in the figure. Moreover, ABC is a straight line. Using the given information, find the value of x .



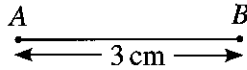
23. Factorize: $9 - 4y^2$

24. In the given triangle ABC , $\tan \theta = \frac{3}{4}$. Find the length of AB in centimetres.

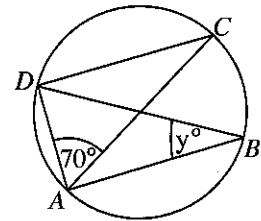


[see page five]

25. In the given figure, draw a sketch of the construction lines that are needed to find the points which are 2 centimetres from each of the points A and B.

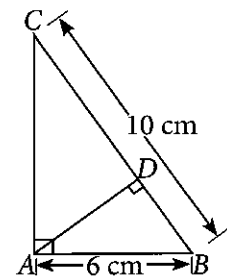


26. AC is a diameter of the circle shown in the figure. Find the value of y , using the given information.



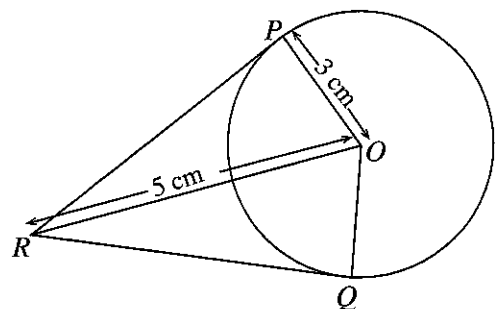
27. Solve: $\frac{1}{3x} - \frac{1}{4x} = \frac{1}{12}$

28. Using the information in the figure, find the length of BD in centimetres.
(Hint: The triangles ABC and ABD are equiangular.)



29. If $x + y = 3$ and $xy = 2$, find the value of $x^2 + y^2$.

30. RP and RQ are the tangents drawn from the point R to points P and Q on the circle with centre O shown in the figure. Using the given information, find the perimeter of the quadrilateral $RQOP$ in centimetres.



[see page six]

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

1. (a) Simplify:

(i) $\frac{2}{3} + \frac{4}{5} - \frac{4}{15}$

(ii) $1\frac{3}{4} \times \frac{2}{9} + \frac{14}{15}$

- (b) Mala wants to buy a sewing machine. She has an amount of money equal to $\frac{3}{7}$ of its price. If she needs 16 000 rupees more to buy the sewing machine, find the price of the sewing machine.

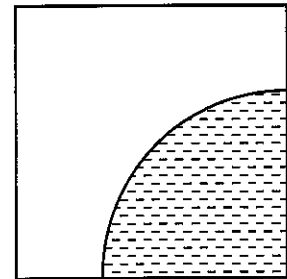
2. A square shaped garden is shown in the figure given below. A part of this garden is a pond in the shape of a sector of a circle of radius 7 m and angle at the centre 90° .

(Use $\frac{22}{7}$ for the value of π .)

- (i) Show that the area of the pond is $\frac{77}{2} \text{ m}^2$.

The total area of the square shaped garden is $\frac{22}{7}$ times the area of the pond.

- (ii) Show that the area of the garden is 121 m^2 .



- (iii) Find the length of a side of the garden.

- (iv) Find the perimeter of the garden.

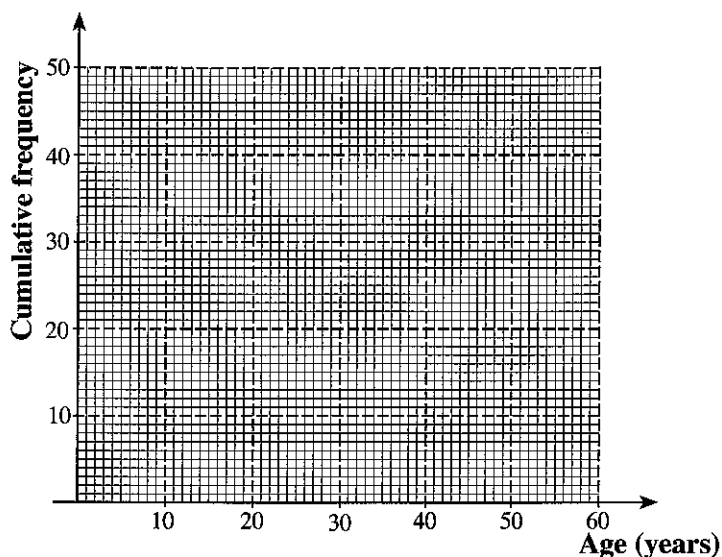
- (v) Find the number of flower pots that are required to be placed 0.5 m apart from each other along the curved edge of the border of the pond from one end to the other, inclusive of a flower pot at each end. For this purpose, the length is measured along the curved edge.

[see page seven]

3. An incomplete cumulative frequency distribution prepared using the information collected about the ages of the teachers of a primary school is given below.

Age (Years) (class interval)	No. of Teachers (frequency)	Cumulative Frequency
20 - 30	10	10
30 - 40	18	28
40 - 50	12	
50 - 60	8	

- (i) Using the given cumulative frequency distribution, write the modal class.
- (ii) Complete the cumulative frequency column.
- (iii) In the given coordinate plane, draw the cumulative frequency curve corresponding to the completed cumulative frequency distribution.



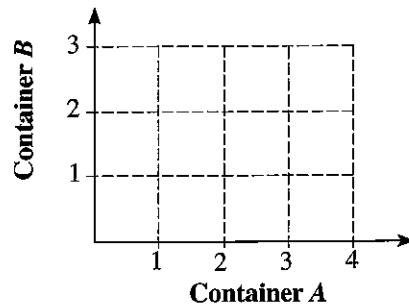
- (iv) Find the first quartile and the third quartile using the cumulative frequency curve.

4. The ratio of the number of male workers to the number of female workers to the number of supervisors employed in an apparel factory is 15:10:2. The number of supervisors in the apparel factory is 12.

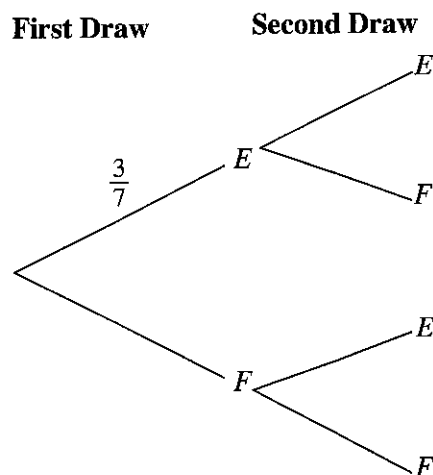
- (i) Find how many female workers are employed in this apparel factory.
- (ii) Find the total number of people in these three categories.
- (iii) If the number of supervisors remains the same, find separately, the number of male workers and the number of female workers that should be **newly** employed to change the ratio given above to 12:10:1.

5. Identical balls have been placed in two containers *A* and *B*. Container *A* has 4 balls numbered from 1 to 4. Container *B* has 3 balls numbered from 1 to 3. A ball is drawn randomly from each container.

- (i) Using the symbol 'X', indicate the sample space of the above experiment in the grid given below.



- (ii) In the grid, encircle the event of the sum of the numbers on the two balls drawn from the two containers being 5, and write the probability corresponding to this event.
- (iii) Now all 7 balls are placed in container *A*. Of the 7 balls in this container, 2 are drawn randomly one after the other **without replacement**. It is recorded whether the number on each ball that is drawn is even or odd.
- (a) Complete the tree diagram given below by writing the corresponding probabilities. Drawing an even numbered ball is denoted by *E* and drawing an odd numbered ball is denoted by *F*.



- (b) Find the probability that at least one of the two balls that are drawn in this experiment is an even numbered ball.




අධ්‍යයන පොදු සහතික පත්‍ර (සාමාන්‍ය පෙළ) විභාගය, 2017 දෙසැම්බර්
 කல்විப் பொதுத் தராதரப் பத்திர (சாதாரண தர)ப் பரீட்சை, 2017 டிசெம்பர்
General Certificate of Education (Ord. Level) Examination, December 2017

கணிதம்	II
Mathematics	II

பேரூர் தேவியை மீதிக்கிட்டு விட்டாள்
இரண்டு மணித்தியாலமும் முப்பது நிமிடமும்
Two hours and thirty minutes

- * Answer **ten** questions selecting **five** questions from **Part A** and **five** questions from **Part B**.
- * Each question carries **10** marks.
- * The volume of a right circular cylinder of radius r and height h is $\pi r^2 h$.
- * The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$.

Part A

Answer five questions only.

1. (a) The nominal value of a share of a certain company is 100 rupees. A person bought shares of this company by investing 150 000 rupees, when the market value of a share was 150 rupees.
 - (i) Find how many shares he bought.
 - (ii) Find the nominal value of the shares he bought.At the end of the year, he received 10 000 rupees as the dividend income for these shares.
 - (iii) Find the annual dividend percentage the company paid.
 - (b) If the value of a certain kind of machine after paying customs duty of 15% is 230 000 rupees, find the value of this machine before paying the customs duty.
-
2. An incomplete table of values prepared to draw the graph of the function $y = -x^2 + 4x - 3$ is given below.

x	-1	0	1	2	3	4	5
y	-8	-3	0		0	-3	-8

- (i) Find the value of y when $x = 2$.
- (ii) Using the scale of 10 small divisions representing one unit along the x -axis and along the y -axis, draw the graph of the above function on a graph paper.
- (iii) Draw the axis of symmetry of the graph and write its equation.

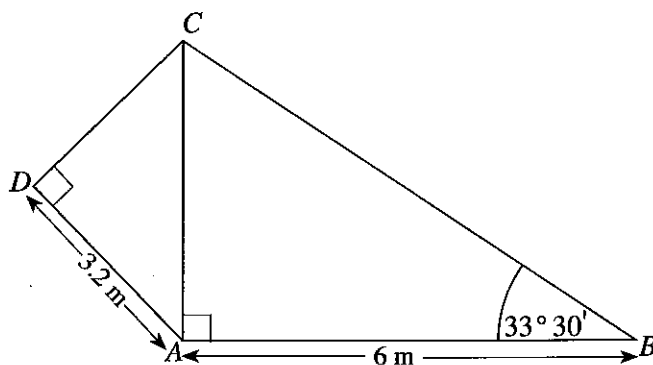
Answer the following questions using the graph.

- (iv) Write the coordinates of the maximum point of the graph.
- (v) Find the x -coordinates of the intersection points of the graphs of $y = -x^2 + 4x - 3$ and $y = -1$, to the first decimal place.

3. The value of x satisfies the equation $\frac{x}{x+2} = \frac{x+2}{2x+2}$.

- Show that $x^2 - 2x - 4 = 0$.
- Using the formula or otherwise, solve the quadratic equation in (i).
- By using 2.24 for the value of $\sqrt{5}$, find the values of x to the first decimal place.
- Show that $2x + 4$ is positive.

4. In the given figure, the triangles ABC and ADC are right angled.



(a) Use the trigonometric tables in answering the following questions.

- Find the length of AC to the nearest metre.
- Find the magnitude of $\hat{ACD}$ using the answer to (i) above.

(b) Find the length by which AB is represented in a scale diagram drawn to the scale 1:75.

5. (a) Solve the pair of simultaneous equations given below.

$$4x + 3y = 21$$

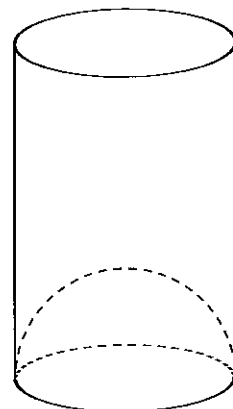
$$3x - y = 45$$

(b) Solve the inequality $3(5 + 2x) - 8 \geq 4$ and represent the solutions on a number line.

6. (a) A sketch of a cylindrical flask is given in the figure. The height of the flask is three times its radius. The bottom of the flask is raised in the shape of a hemisphere as shown in the figure. The radius of the hemisphere is equal to the radius of the cylinder.

(Use $\frac{22}{7}$ for the value of π).

- If the radius of the cylinder is r , show that the volume of the flask is $\frac{7}{3}\pi r^3$.
- If the volume of the flask is 198 cm^3 show that $r = 3 \text{ cm}$.



(b) Using the logarithms table, find the value of $\sqrt{1.7} \times 0.32$.

Part B*Answer five questions only.*

7. (a) The first term of an arithmetic progression is 3 and the sum of its fifth and seventh terms is 46.
- Find the common difference of this progression.
 - Find the sum of the first 12 terms of this progression.
- (b) The difference between the third term and the second term of a geometric progression is 24. The first term of this progression is 2 and its common ratio is positive. Find the common ratio of the progression.
8. Use only a straight edge with a cm/mm scale and a pair of compasses to do the following constructions. Show the construction lines clearly.
- Construct the triangle ABC such that $AB = 7.0$ cm, $AC = 7.5$ cm and $\hat{BAC} = 60^\circ$.
 - Construct the angle bisector of $\hat{BAC}$.
 - Construct the perpendicular bisector of AC and name the point at which it intersects the above constructed angle bisector of $\hat{BAC}$ as O .
 - Construct the circle with centre O and radius OA and construct the tangent to this circle at A . Mark a point P on this tangent such that $AP = OA$.
 - From P , construct another tangent to the above constructed circle and name the point it touches the circle as Q .
9. The masses of 100 students are measured in kilogrammes and the following frequency distribution is prepared using this information.

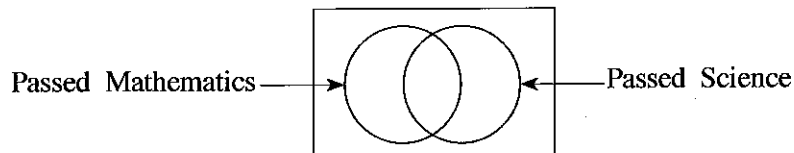
Mass (kilogrammes) (class interval)	30 - 32	32 - 34	34 - 36	36 - 38	38 - 40	40 - 42
Number of Students (frequency)	5	10	38	30	11	6

- What is the median class of the above frequency distribution?
- By using a suitable assumed mean or otherwise, find the mean mass of a student.
- A lift in a certain building can carry a maximum of 720 kg per trip. Estimate the minimum number of upward trips the lift should make to carry these 100 students from the ground floor to the top floor.

10. The following information is given based on the results obtained by 50 students who appeared for the subjects Mathematics and Science in a certain examination.

- 12 students failed both subjects.
- 6 students passed only Science.

(i) Copy the given Venn diagram in your answer script and represent the above information in it.

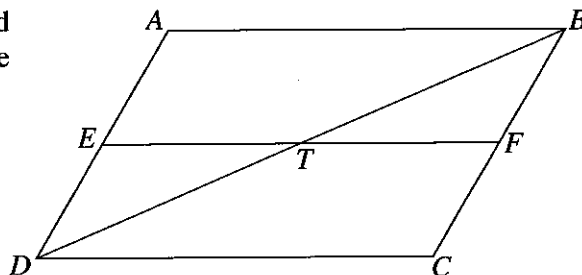


(ii) Find the number of students who passed Mathematics.

The number of students who passed Science is one more than the number of students who passed Mathematics.

- (iii) Find the number of students who passed both subjects.
 (iv) Find the number of students who passed Mathematics only.

11. In the given figure, $ABCD$ is a parallelogram. E and F are the midpoints of AD and BC respectively. The lines BD and EF intersect at T .

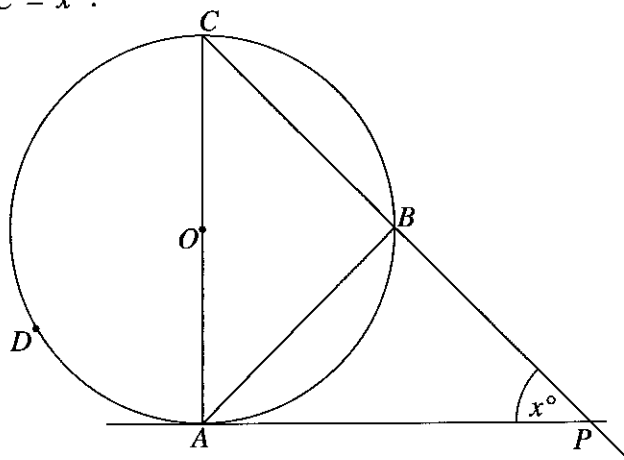


(i) Show that $\triangle DET \equiv \triangle BFT$.

Join BE and FD .

- (ii) Show that $BFDE$ is a parallelogram.
 (iii) Show that, area of $\triangle DET =$ area of $\triangle ETB$.
 (iv) Show that, $4 \times$ area of $\triangle DET =$ area of parallelogram $BFDE$.

12. The points A , B , C and D lie on the circle with centre O shown in the figure, such that AC is a diameter. P lies on CB produced such that the line AP is the tangent to the circle drawn at A . It is given that $\angle APC = x^\circ$.



Copy the figure in your answer script.

(i) With reasons, write the magnitude of $\angle CBA$.

Join BO , CD and BD .

(ii) With reasons, write the magnitude of each of the angles given below in terms of x° .

- (a) $\angle BAC$ (b) $\angle BOC$ (c) $\angle BDC$

(iii) If the lines CD produced and PA produced meet at Q , show that $PQDB$ is a cyclic quadrilateral.