

සබරගමුව පළාත් අධ්‍යාපන දෙපාර්තමේන්තුව
சபரகமுவ மாகாண கல்வித் திணைக்களம்
Sabaragamuwa Provincial Department of Education

Third Term Test 2020

Grade 11

Mathematics II

Three hours

- Select 5 questions from part A and 5 questions from part B and answer 10 questions only
- Write the relevant steps and correct units in answering the questions
- Each question carries 10 marks
- The volume of a right circular cone with the base radius r and right height h is $\frac{1}{3} \pi r^2 h$
- The volume of a right circular cylinder with the base radius r and right height h is $\pi r^2 h$

Part A

Answer 5 questions only

01. An incomplete table showing the y values corresponding to several x values of the quadratic function $y = 5 - (x - 1)^2$ within the interval $-2 \leq x \leq 4$ is given below

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

- i. Find the value of y when $x = 4$
- ii. Using the standard system of axes and a suitable scale, draw the graph of the given quadratic function on a graph paper
- iii. Draw the axis of symmetry of the graph and write the equation of it
- iv. Write the range of x values which satisfies the inequalities $0 > x$ and $0 < y$
- v. The graph of the function $y = 5 - x^2$ can be obtained by changing the location of the drawn graph. Find the values of x when $y = 0$ of the graph $y = 5 - x^2$

02. Jayanatha borrowed Rs. 60 000 from a financial institute to repair his house. It is to be paid back in 10 equal monthly installments with 16% annual interest rate. The interest is calculated according to the reducing balance.

- i. Find the value of a monthly installment
- ii. If the above mentioned loan is taken under 1% monthly simple interest rate, show that the interest to be paid after ten months is greater than the interest paid in installments as calculated in above (i)

03. The masses of chilly harvest that Isuru plucked from his chilly cultivation in 28 turns are as follows.

Mass (kg)	20-24	24-28	28-32	32-36	36-40	40-44	44-48
Number of Times	2	4	6	9	3	2	2

(20 – 24 means , 20 or more than 20 and less than 24)

- According to the table find the mean mass of chilies plucked in one turn
- If the price of one kilogram of chilies is Rs. 450 what is the income that he can expect to receive by selling chilies in first 20 turns .
- After the first 28 turns, the mean mass of chilies plucked in next 7 turns is 23 kg .
What is the mean mass of chilies plucked in whole 35 turns

04. Sadik is a fruit seller . One day he bought a stock of watermelons of 160 kg and separated it into two heaps as big ones and small ones . He sold big watermelons for Rs. 100 each and small ones for Rs. 80 each .

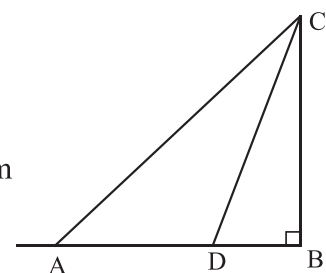
- The number of big melons is 30 more than the small melons
 - The income received by selling big melons is Rs. 4700 more than the income received by selling small melons .
- Build up a pair of simultaneous equations by taking the number of big melons as x and the number of small melons as y and by solving them find the number of melons in each type
 - If he has bought one kilogram of melons for Rs. 70 show that the total profit he receives by selling melons is Rs. 7100

05. (a) An observer who is standing 40 m distance away from a vertical tower on a flat land sees the top of a tower with an angle of elivation 30° .

- Draw a scale diagram by representing 5 m of the actual distance by 1 cm
- Using the scale diagram find the height of the tower correct to the nearest meter .

- (b) AB is a flat ground and BC is one side of a building . AB = 80 m and the angle of elivation of C from A is 43°

- Find the height of BC
- If the point D is situated between A and B and $CD = 80$ m
find the magnitude of the angle BDC



06. The base radius of a right solid cylinder is r and the height of it is 4 cm more than the radius
- Denote the height of the cylinder using “ r ”
 - If the area of the curved surface of it is 88 cm^2 show that ‘ r ’ satisfies the quadratic equation $r^2 + 4r - 14 = 0$ $\left(\pi = \frac{22}{7}\right)$
 - By solving this equation show that the base radius of the cylinder is $3\sqrt{2} - 2$ and by using it find the height of the cylinder $(\sqrt{2} = 1.41)$

Part B – Answer five questions only

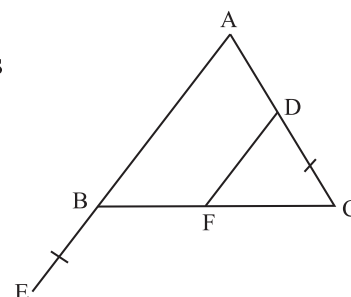
07. (a) On a board prepared for an activity of mathematics in primary classes , there are small squares drawn and numbered from 1 to 20 respectively . On each square a certain number of buttons are kept and the number of buttons so kept are in an arithmetic progression such that the number on each square is three more than the number on the previous square .
- When 6 boxes including 100 buttons in each one are using to keep buttons like this it seems that the number of buttons on the 18th square is 58 but the remaining number is not enough to complete the 19th square . Find the number of buttons remaining after keeping on the 18th square.
- (b) The sum of the first 6 terms of a geometric progression is 381 . Find the 7th term of this progression.

08. Use only a straight edge with cm / mm scale and a pair of compasses for the following constructions. The construction lines should be drawn clearly .
- Draw the straight line $AB = 7 \text{ cm}$ and construct the perpendicular bisector of it
 - Construct the circle in which AB is a chord and the radius is 4 cm. Name the centre of the circle as O
 - Construct a tangent to the circle at A and name it as MAT .
 - Construct a parallel line to the tangent AT at B and name the point it intersect the circle as C
 - Name an angle equal to \hat{ACB} and give reasons for it .

09. In the triangle ABC , $AB = AC$. D is on the line AC . Line AB is produced such that $CD = BE$. DF is drawn parallel to AB .

- Prove that DFC is an isosceles triangle .
- If the lines BC and DE intersect at T prove that $\triangle BTE \equiv \triangle DFT$

- Prove that $BDFE$ is a parallelogram.
- Write an equal ratio to $\frac{DF}{AB}$



10. The thickness of a solid metal cylindrical plate in which the radius is r is $\frac{3}{4}$ cm .

- Find the volume of the plate in π and r
- Find the volume of a solid metal cone in which the base radius is $2r$ and right height is 6 cm , in π and r

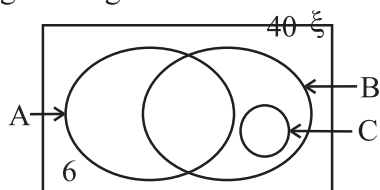
iii. The cone is made by melting 12 metal plates . If 99 cm^3 of metal is remaining after the

making of the cone show that
$$r = 3\sqrt{\frac{11}{\pi}}$$

iv. Using the logarithm tables find the radius of a cylindrical metal plate . Take $\pi = 3.14$

11. In an exhibition of a school ,in the stall run by the past pupils association there were shirts , umbrellas , and caps in school colours to be sold . As the number of caps is limited ,caps are issued to customers only who buys a shirt . .

In a certain time period 40 people came to the stall and the following incompletd Venn diagram shows the information about their buying . Copy this Venn diagram to your answer script and complete it according to the given data .



- "A" shows the people who bought umbrellas . Name the two sets B and C appropriately .
- Number of people who bought umbrellas is 25 and number who bought shirts is 22. What is the number of people who bought only umbrellas.
- The number of people who bought only two types of items from above three types is 19 . How many people have bought caps ?
- Name the set who bought only shirts, in set notation using A , B and C

12. In the triangle ABE , $AB = AE$. The circle in which the diameter is AB intersect the lines BE and AE at C and D respectively .

- Prove that $\triangle ABC \cong \triangle AEC$
- The tangent drawn to the circle at C intersect the line AE at T.
Prove that $DT = TE$

