



Grade
11

Third Term Test -2020

MATHEMATICS

Part I

2 hours

Name of School :

Name of Student / Index No. :

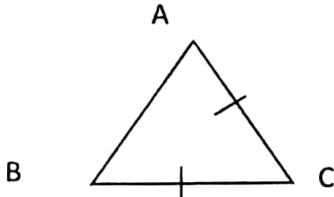
Part A

- Answer all the questions

(1) What is the most suitable value for $\sqrt{57}$
 I. 7.4 II. 7.5 III. 7.6 IV. 7.7

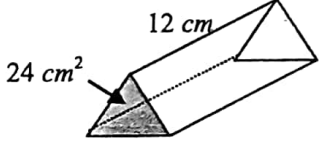
(2) Factorize $x^2 + 7x - 18$

(3) In the triangle $AC = BC$ and $\hat{A}BC = 2\hat{A}CB$ Find the magnitude of $\hat{A}BC$

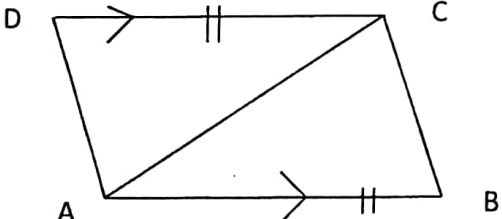


(4) Find the least common multiple of $6xy, 8y^2, 4y$

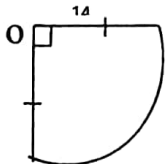
(5) Find the volume of a prism of area of cross section is 24 cm^2 and the height 12 cm



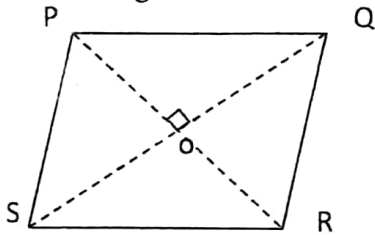
(6) In the quadrilateral ABCD $AB = CD$ and $AB \parallel DC$. Fill in the blanks
 $\hat{D}CA = \dots\dots\dots$
 $\Delta ADC \equiv \Delta ABC$ ($\dots\dots\dots$)



(7) Find the arc length of the sector of center O

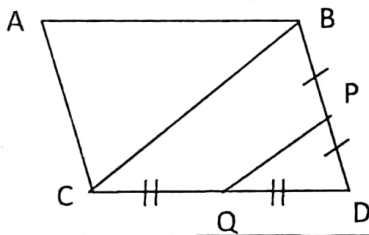


- (8) In the rhombus PQRS, the diagonals PR and QS intersect at O. PR = 12 cm and QS = 16 cm
Find the length of a side of the rhombus



- (9) Simplify algebraic fractions, $\frac{1}{2x} + \frac{3}{8x}$

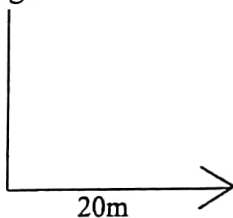
- (10) ABC is an equilateral triangle. Q is the mid point of CD and P is the mid point of BD. If PQ = 6 cm, Find the perimeter of the triangle ABC



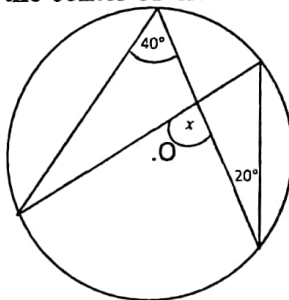
- (11) If $A = \begin{pmatrix} -2 & 1 \\ 3 & 0 \end{pmatrix}$ and $B = \begin{pmatrix} 1 \\ -3 \end{pmatrix}$, Find the metric AB.

- (12) The height of a right cylindrical shape concrete post is 2 m. The length around the post is 3 m. If curved surface of the cylinder is to be painted, Find the area to be painted?

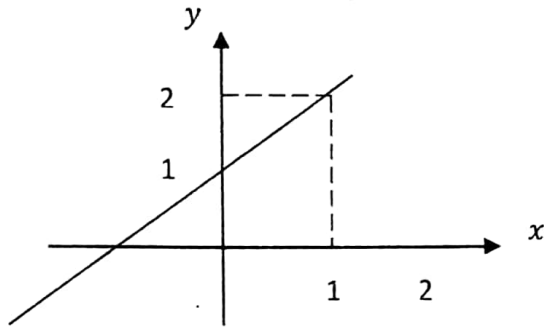
- (13) Child observes a ball on the ground at the angle of depression of 40° from the top of a building of height 8 m and 20 m away from the bottom of the building. Indicate the data in the diagram.



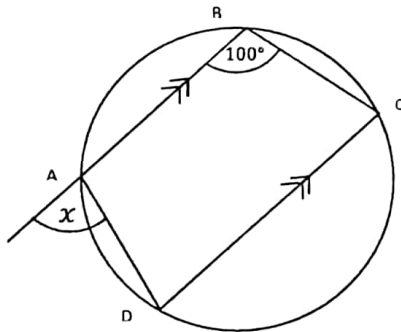
- (14) O is the center of the circle. Find the value of x .



(15) Find the gradient of the straight line.

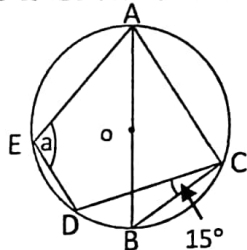


(16) In the figure $AB \parallel DC$. Find the value of x .

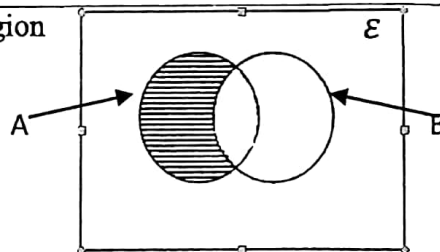


(17) 6 men take 3 days to complete exact half of a work. How many men should be involved to complete the work within 4 days.

(18) O is the center of the circle. Find the value of a .



(19) Express the shaded region in words:



- E - students of the class
- A - students who wear masks
- B - Girls of the class

(20) Find the distance travelled by a vehicle in 10 seconds when it travels at the uniform speed of 72 kmh^{-1}

(21) Express in index notation, $\log_5 = 0.6990$

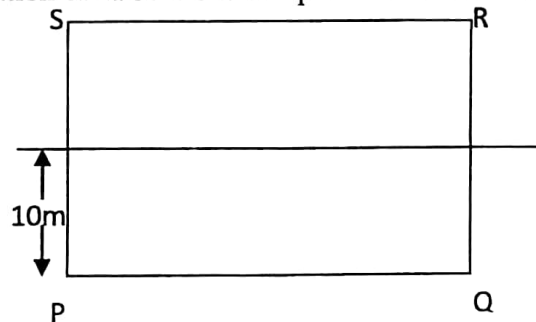
(22) While A and B are two independent events $P(A) = \frac{1}{3}$ and $P(B) = \frac{2}{5}$. Find $P(A \cap B)$

(23) Rs 720 is paid for a trade building as rate for a quarter when provincial council charges 8% annual rate. Find the annual assessed value of the building.

(24) Find the Inter quartile range of following data.

2, 2, 3, 4, 5, 5, 7, 8, 9, 10, 14

(25) The diagram shows a sketch of the land P Q R S. There is a wall 10 m away from the boundary PQ. Find the location of M on the wall equidistance from SP and SR.



Part B

(1) In a certain quarantine centre, $\frac{1}{6}$ of the amount of separated money for sanitation, $\frac{1}{3}$ of the amount for laboratory experiments, $\frac{2}{3}$ of the balance amount is used for food and the rest for other needs.

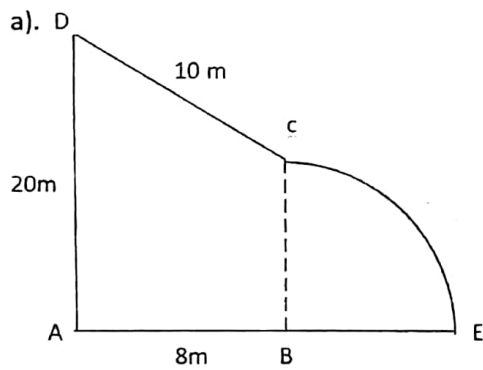
(i) Find the total fraction of amount of money separated for sanitation and Lab experiments from the whole separated money.

(ii) Find the amount separated for food as a fraction of the total.

(iii) If the amount separated for other needs is Rs. 120,000/- , Find the total amount separated to the center.

(iv) Find the ratio between the amount separated for food and sanitation.

(2) (a) The diagram shows a sketch of a play ground ABCD is a trapezium and BCF is a sector.



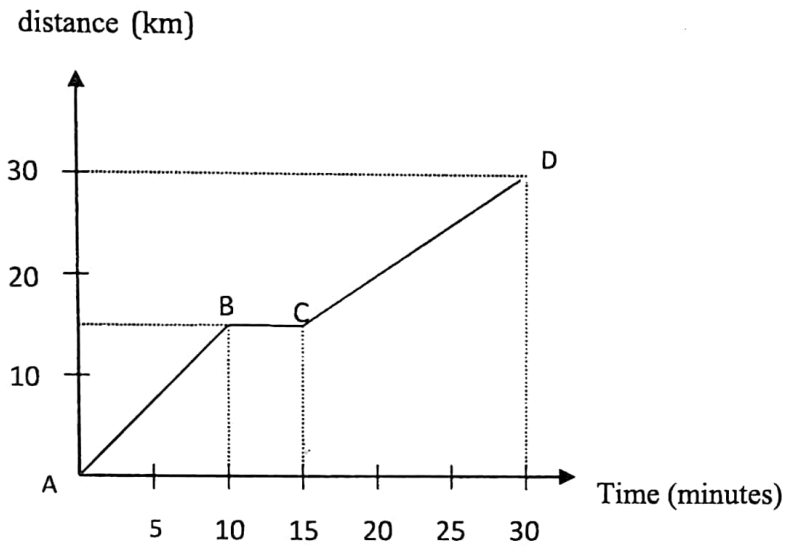
$AB = 8\text{ m}$, $AD = 20\text{ m}$ and $DC = 10\text{ m}$

(i) Find the radius of the sector

(ii) Find the perimeter of the play ground

(iii) Find the area of the play ground

(b) The distance time graph related to a certain motion is given below



(i) Find the speed from A to B

(ii) Find the average speed from A to D

(3) (a) When a motorcycle worth Rs. 275,000/- is imported the tax of 60% is charged.

(i) Find the value of the motorcycle after paying the tax.

(ii) When the motorcycle is sold for Rs. 462,000/-, find the percentage of profit the seller received.

(b) Samith invested Rs. 75,000/- in a company to buy shares of Rs. 25/- each when the company pays Rs. 15/- per share as dividend

(i) Find the annual dividend income received by Samith.

After Samith obtained income from the first year, then he sold all the shares at Rs. 40/- each. After that he invested the amount taken by selling the shares and dividend to buy shares of Rs. 50/- each in another company. He obtained dividend income of Rs. 66,000/- from second investment.

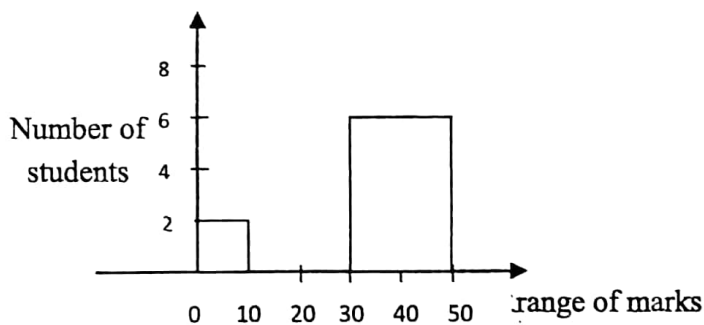
(ii) Find the number of shares bought from the second company.

(iii) What is the dividend per share of the second company.

(4) (a) The table shows marks of a set of students for a Mathematics paper

Range of marks	Number of students
0 - 10	2
10 - 20	6
20 - 30	8
30 - 50

(i) According to the information of above table, complete the following histogram.



(ii) Fill in the blanks of the table using the histogram

(iii) Using the histogram, draw the frequency polygon

(b)



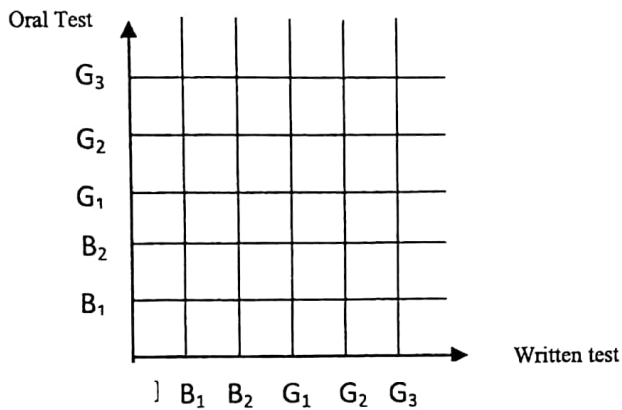
The pie chart shows how grade 10 students selected their aesthetic subject

(i) Find the number of 120 students selected Art

While equal number of students selected Music and Dancing, the number of student selected Drama is exact half of the number of students who selected Music

(ii) Find the magnitude of angle at the center of each sector and indicate it in the pie chart.

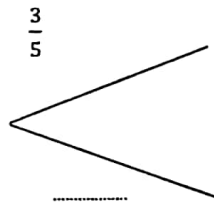
- (5) (a) The following incomplete grid shows the sample space of ways of winning a competition. Which is done orally and written by a group of students of two boys and three girls



- i. Complete the above grid
- ii. Encircle the event of winning a test by a boy and the other test by a girl in the grid and Find the probability of it?

- (b) The above competition is done by selecting the students only who win the written test or the oral test. The probability of passing the written test by Nimal is $\frac{3}{5}$

- i. Complete the following tree diagram.



- ii. If the events of passing the oral test or not are mutually exclusive events, expand the above tree diagram indicating the probabilities of passing the oral test or not.
- iii. If Nimal participated for both the tests find the probability of losing the competition after facing both the tests.



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MATHEMATICS Part II

3 hours

Name of School :

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- Answer ten questions selecting five questions from part A and five question from part B
- Each question carries 10 marks
- The volume of a right circular cylinder of base radius r and height h is $\pi r^2 h$
- The volume of a cone of radius r and height h is $\frac{1}{3} \pi r^2 h$

Part A

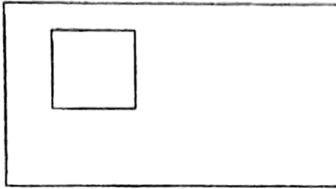
(1) A furniture set priced at Rs. 85,000.00 for outright purchase can be bought by making a down payment of Rs. 13,000.00 and paying the rest in 24 equal monthly installments of Rs. 3,562.50. If the interest on the loan is calculated on the reducing loan balance, find the annual interest rate.

(2) An incomplete table of values prepared to draw the graph of the function $y=(x-3)(x+1)$ is given below.

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

- Find the value of y when $x=1$
- Using the standard axes and suitable scale, draw the graph of the above function.
- Using the graph, find the roots of the equation $x^2 - 2x - 3 = 0$
- Find the range of x which the function is decreasing from 4 to -3
- Express the above function in the form of $y = (x - a)^2 + b$

(3)



The diagram shows a plane of a rectangular shaped wall with a square shaped window. While the length of the window is x , the length of the wall is 6 m more than the three times the length of the window. The width of the wall is 10 m more than the length of the window. While Rs. 50.00 is charged to paint $1 m^2$ of the wall, Rs. 5000.00 is charged to paint whole wall completely. Show that, x is satisfied the equation $x^2 + 18x - 20 = 0$ and find the length of the wall to the nearest meter. (Take $\sqrt{101} = 10.5$)

(4) Saman and Kamal has a certain amount of money. When twice of the amount of money Saman has, is added to the amount of money Kamal has, Rs. 700.00 is obtained. Both of them need to buy two shorts which are at same cost. Saman needs five times of the amount of money he has to buy the shirt and Kamal needs Rs. 100.00 more than three times the amount of money he has to buy the shirt.

- i. Construct a pair of simultaneous equations by taking the amount of money Saman has as x and Kamal has as y .
- ii. By solving the pair of simultaneous equations, find the amount of money Sman has and Kamal has separately.
- iii. If Rs. 8,000.00 is enough to buy three above type of shirts and four trousers of each cost Rs. m , build up an inequality and by solving it find the maximum cost of a trouser.

(5) The angle of elevation of the top of the Telecommunication tower **AB** from a point **C** on the horizontal ground and **50 m** away from the bottom **B** of the tower is $30^\circ 22'$. Then the top of the post is observed again from the point **D** which is on the same horizontal ground and **30 m** towards the tower from the point **C**.

- i. Sketch a diagram to depict the given information.
- ii. find the height of the tower to the nearest first decimal place using the trigonometric tables.
- iii. Find the angle of elevation of the top of the tower when it is observed from the point **D**

- (6) The following information shows the income gained by selling tickets to tourists who came to visit sanctuary during 50 days.

Income	100-	200-	300-	400-	500-	600-	700-
(In American dollar)	200	300	400	500	600	700	800
Number of days	7	6	8	11	4	9	5

- i. Calculate the mean income per day using the given information.
- ii. Accordingly calculate the expected monthly income by the selling tickets.
- iii. Show that, after 40% of monthly income was separated to maintenance, The remaining income exceeds 1,430,000.00 Sri Lankan Rupees.
(1 American dollar = 180 Sri Lankan Rupees)

Part B

(7)

- a) If a certain type of plants were kept in a ornamental plants showroom such that 7 plants are in the first row and 13 plants are in the third row such that the terms of an arithmetic progression.
 - i. Find the common difference of an arithmetic progression.
 - ii. If there are 64 plants in the last row find how many plant rows are there.
 - iii. If the cost of a plant is Rs. 25.00, find the amount of money needs to buy all the plants in the showroom.
- b) The first term and the common ratio of a geometric progression is $\frac{1}{8}$ and 2 respectively.
Which term is 8.

(8) Use only a straight edge with a cm/mm scale and a pair of compasses for the following constructions. Show the construction lines clearly.

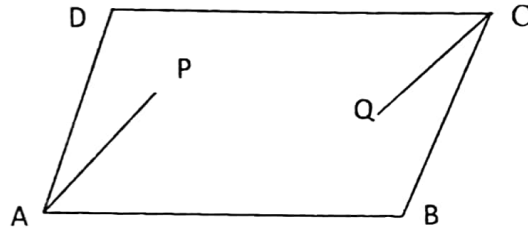
- i. Construct the triangle ABC such that $AB = 9$ cm, $BC = 8.5$ cm and $AC = 7$ cm.
- ii. Construct the angle bisector of \widehat{BAC} and name the point at which it meets BC as M.
- iii. Mark the point P on AC such that $\widehat{CAM} = \widehat{CMP}$.
- iv. Construct the circle which goes through the points A, M and P.
- v. Give reasons to prove, the line BC is a tangent to the circle at M.

(9) PQ and RS are two chords of a circle with centre O. The chords PQ and RS are produced to meet at M. If PS = SM, prove that $2 \angle QRS + \angle PSM = 180^\circ$ by giving reasons

(10) a) O is a any point in the parallelogram ABCD. The perpendicular which is drawn from O to AB is OP and from O to BC is OQ

- i. Depict the given information in a diagram.
- ii. Prove that $AO^2 + OC^2 = AP^2 + PB^2 + BQ^2 + QC^2$

b)



P and Q are two points in the parallelogram ABCD. In the figure, $AP = QC$ and $\angle DAP = \angle BCQ$

- i. By joining necessary points, prove that $\triangle ADP \cong \triangle BQC$
- ii. Prove that, APCQ is a parallelogram (Hint: Join AC)

(11) A right circular cone shaped container of radius r and height 12 cm is filled by water completely and poured that water into a cubical shaped container of side length 12 cm. If half of the cubical shaped container is filled by water at that time, show that the radius of the right circular cone shaped container, $r = 6\sqrt{\frac{6}{\pi}}$ and by getting $\pi = 3.14$ and using logarithms table find the value of r to the nearest whole number.

(12) The results of PCR tests which were done by using randomly selected 64 persons who are in a Covid 19 affected area, is given below. While 35 males faced the test, the number of Covid 19 positive males are twice of the number of Covid 19 positive females. The number of Covid 19 negative females are 21.

- i. Draw a venn diagram to depict this information
- ii. Find the number of Covid 19 negative males
- iii. Shade the region in the venn diagram which shows the Covid 19 positive males.
- iv. While six persons from the Covid 19 negative persons as suspicious patients, all of them are females. Draw the venn diagram again by including above information.
- v. If a person is selected randomly from the above group of persons, Find the probability of that person being a Covid 19 negative female.