

## High School Model Paper 2021-22

### Mathematics

#### Class-10

**Time : Three hours 15 Minutes**

**Max. Marks: 70**

**Note:-** First 15 minutes time has been allotted for examinees to read this question paper.

#### **Instructions:-**

- (i) There are seven questions in this question paper.
- (ii) All questions are compulsory.
- (iii) In the beginning of each question it has been mentioned how many parts of it are to be attempted.
- (i) Marks allotted to each question are mentioned against it.
- (ii) Start from the first question and go up to the last question. Do not waste your time over a question which you cannot solve.
- (iii) If you need place for rough work, do it on the left page of your answer book and cross (×) the page. Do not write the solution on that page.
- (iv) Write the solutions on pages of both sides of answer-book. Write the steps of solution of all questions except question no.1.
- (v) Do not rub off the arcs and the lines constructed in a question of construction. Write steps of construction, if asked.
- (vi) Draw the figure in the solution of a question wherever it is necessary, otherwise in its absence the solution will be treated as incomplete and wrong.

#### **1. Do all the parts:**

Four alternatives of the answer of each part are given, out of which only one is correct. Pick out the correct alternative and write it in your answer-book-

(a) Which one is pair of co-prime numbers-

1

- (i) (14, 35)                      (ii) (18, 25)

(iii) (31, 93)      (iv) (32, 62)

(b) Product of roots of quadratic equation  $3x^2 - 4x = 0$  is- 1

(i) 0      (ii)  $\frac{4}{3}$

(iii)  $\frac{-4}{3}$       (iv)  $\frac{3}{4}$

(c) Properties of similar triangles are- 1

- (i) Its corresponding sides are proportional
- (ii) Its corresponding angles are equal
- (iii) Both (i) and (ii)
- (iv) None of these

(d) The value of  $\cos 60^\circ \cos 30^\circ - \sin 60^\circ \sin 30^\circ$  is- 1

(i) 0      (ii)  $\frac{\sqrt{3}}{2}$

(iii)  $\frac{1}{2}$       (iv) 1

(e) which one is not central tendency - 1

- (i) Mean      (ii) Mode
- (iii) Median      (iv) Standard

(f) The Co-ordinate of two points are (-8,0) and (0,-8). The Co-ordinate of mid point of line-segment joining these points will be- 1

- (i) (-4,0)      (ii) (0,-4)
- (iii) (-4,-4)      (iv) (4,-4)

## 2. Attempt all parts :

(a) Find the discriminant and nature of the roots of the quadratic equation  $2x^2 - 4x + 3 = 0$ . 1

(b) If  $15 \cot A = 8$  then find out the value of  $\sin A$  and  $\sec A$ . 1

(c) If the area of two similar triangles are 121 square cm and 289 square cm respectively. Then find the ratio between its corresponding sides. 1

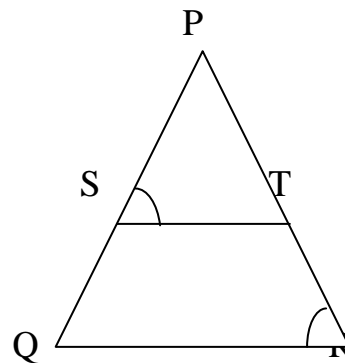
(d) In a certain distribution, mean and mode are 16 and 13 respectively. Find the median of the distribution. 1

**3. Attempt all parts :**

(a) prove that  $\sqrt{3}$  is irrational number. 2

(b) Find the value of a; for which pair of linear equations  $ax + 2y = 2$ ,  $8x + ay = 4$  have an infinite number of solutions. 2

(c) In the given figure,  $\frac{PS}{SQ} = \frac{PT}{TR}$  and  $\angle PST = \angle PRQ$ . Prove that  $\Delta PQR$  is an isosceles triangle. 2



(d) The radii of circular ends of the frustum of 40 cm high cone are 38 cm and 8 cm, find the slant height of the frustum. 2

**4 Attempt all parts :**

(a) Use Euclid’s algorithm to find the H.C.F of 272 and 1032. 2

(b) D is a point on the side BC of a triangle  $\Delta ABC$  such that  $\angle ADC = \angle BAC$ . Show that  $CA^2 = CB \cdot CD$ . 2

(c) Draw a line segment of 5 cm and divide it in the ratio of 2:3. Measure the length of both the parts. 2

(d) If  $\cot \theta = \frac{7}{8}$ , then find the value of  $\frac{(1 + \sin \theta)(1 - \sin \theta)}{(1 + \cos \theta)(1 - \cos \theta)}$ . 2

**5 Attempt all parts :**

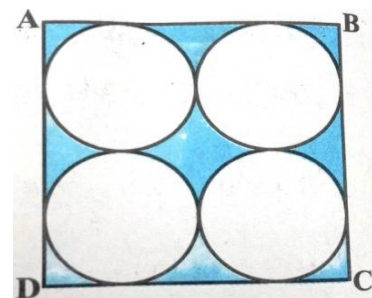
- (a) If the sum of the squares of two consecutive positive integers is 365. Find the integers. 3
- (b) In which ratio does the point  $(-4,6)$  divide the line segment joining the points  $A(-6, 10)$  and  $B(3, -8)$ ? 3
- (c) A metallic sphere of radius 4.2 cm is melted and recast into the shape of cylinder of radius 6 cm. Find the height of the cylinder. 3
- (d) The following table shows the Literacy rate (In Percentage) of 35 cities-

Literacy rate (%)	45–55	55–65	65–75	75–85	85–95
No. of cities	3	10	11	8	3

Find the mean Literacy rate. 3

**6. Attempt all the parts :**

- (a) The difference between squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers. 4
- (b) In the given figure, ABCD is square of side 14 cm. Find out the area of the shaded region. 4



- (c) Construct a tangent to a circle of radius of 4 cm from a point on the concentric circle of radius 6 cm and measure its length. 4
- (d) A survey was conducted of the heights of 51 girls of class 10 in a school. The following data has been obtained-

Height (cm)	Less than 140	Less than 145	Less than 150	Less than 155	Less than 160	Less than 165
Number of girls	4	11	29	40	46	51

Find the median height.

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**6. Attempt all the parts :**

- (a) Solve the following pair of equations by reducing them to a pair of linear equations :

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$$\frac{10}{x+y} + \frac{2}{x-y} = 4$$

$$\frac{15}{x+y} - \frac{5}{x-y} = -2$$

Or

The sum of the reciprocals of Rehman's ages (in years) 3 years ago and 5 years from now is  $\frac{1}{3}$ . Find his present age.

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- (b) The angles of depression of the top and bottom of an 8 m. tall building from the top of a multi-storeyed building are  $30^\circ$  and  $45^\circ$  respectively. Find the height of the multi-storeyed building and the distance between two buildings.

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Or

From a point P on the ground, the angle of elevation of the top of a 10 m tall building is  $30^\circ$ . A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is  $45^\circ$ . Find the length of the flagstaff and the distance of the building from the point P. (You may take  $\sqrt{3} = 1.732$ )

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