Mathematics (Science Group) 10th Part-II

Objective Part

For Objective Part See Qureshi Invincible Guess Papers

Mathematics (Science Group) 10th Part-II

Subjective Part (Section – I)

Q. Solve $3y^2 = y(y - 5)$ by factorization.

Q. Factorize $x^2 - x - 2 = 0$

Q. Solve by Factorization $5x^2 = 30x$

Q. Solve $5x^2 = 30x$ by factorization.

Q. If $lx^2 + mx + n = 0, l \neq 0$. What is quadratic formula?

Q. Write the names of the methods for solving a quadratic equation.

Q. Solve $\sqrt{3x + 18} = x$.

Q. Define quadratic equation.

Q. Define reciprocal equation.

Q. Show that $x^3 + y^3 = (x + y)(x + \omega y)(x + \omega^2 y)$

Q. Evaluate $\omega^{37} + \omega^{38} + 1$

Q. Find the value of x, by using quadratic formula? $x^2 - 5x + 5 = 0$

Q. Find the value of h, if the sum of the roots is equal to 3-times the product of the roots of the equation $3x^2 + (9 - 6h)x + 5h = 0$.

Q. What is meant by symmetric function?

Q. If α, β are the roots of the equation $x^2 + px + q = 0$, then evaluate $\alpha^2 + \beta^2$.

Q. Prove that sum of all the three cube roots of unity is zero.

Q. What is the quadratic equation when roots are a and b?

Q. Prove that the product of three cube roots of unity is one.

Q. Using synthetic division, show that $x - 2$ is the factor of $x^3 + x^2 - 7x + 2$.

Q. What is solution set?

Q. Prove that the sum of all cube roots of unity is zero.

Q. Find $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$ of the roots of the equation $x^2 - 4x + 3 = 0$.

Q. Differentiate between ratio and proportion.

Q. Express the following as a ratio a : b and as a fraction in its simplest (lowest) form. 27min. 30 sec : 1 hour

Q. Find fourth proportional to
$(p^2 - q^2)(p^2 + pq + q^2), p^3 + q^3, p^3 - q^3$

Q. p varies jointly as q and r^2 and inversely as s and t^2, p = 40, when q = 8, r = 5, s = 3, t = 2. Find k.

Q. Define K-Method.

Q. Find the third proportional of $a^2 + b^2$ and $a^4 - b^4$.

Q. If $m = \frac{6pq}{p+q}$ then find the value of $\frac{m+3p}{m-3p}$

Q. In Hooks law, the force F applied to stretch a spring varies directly as the amount of elongation S and F = 32lb when S = 1.6 inches. Find k.

Q. In $\frac{N(x)}{D(x)}$, how D(x) is written in partial or linear factors?

Q. What is an identity?

Q. If a linear factor occurs n time, how many partial fraction are there?

Q. If a quadratic factor occurs once as a factor of D(x), what is the form of partial fraction?

Q. Define direct variation.

Q. Find a mean proportional to 16 and 49.

Q. If U = {1, 2, 3, ..., 20}, X = {1, 3, 7, 9, 15, 18, 20} and Y = {1, 3, 5, ..., 17}, then show that $X - Y = X \cap Y'$

Q. If A, B and C are the subsets of U and A = {1, 2, 4, 8}, B = {2, 4, 6} and C = {3, 4, 5, 6} then verify $(A \cup B) \cup C = A \cup (B \cup C)$

Q. Resolve $\frac{7x+4}{(3x+2)(x+1)^2}$ in partial fractions in the form of unknown constants.

Q. Whether $(7x+5)^2 = 49x^2 + 70x + 25$ an identity?

Q. Resolve $\frac{1}{x^2-1}$ into partial fractions.

Q. Find arithmetic mean of data

45, 60, 74, 58, 65, 63, 56

Q. Define median and write its formula for grouped and ungrouped data.

Q. What is measures of dispersion and how it is calculated?

Q. Define variance and write its formula for grouped and ungrouped data.

Q. Define complement of a Set.

Q. Define Binary Relation.

Q. If $U = \{x / x \in N \wedge 3 < x \leq 25\}$; $x = \{x / x \text{ is prime} \wedge 8 < x < 25\}$ and $Y = \{x / x \in W \wedge 4 \leq x \leq 17\}$, Find the value of $(X \cup Y)' = U - (X \cup Y)$

Q. Find the solution set of $2\sqrt{y} - 3 = 1$.

Q. Define union of two sets.

Q. Write down the formula to calculate geometric mean.

Q. What is weighted mean?

Q. Calculate G.M. for 0.5, 10.0, 2.7, 3.48 and 4.7.

Q. Define a subset and give one example.

Q. Define an onto function.

Q. Define Range, Standard deviation and Variance.

Q. Convert $12°23'35''$ to decimal degrees correct to three decimal places.

Q. Find l, when $\theta = 60°30'$, $r = 15$ mm.

Q. Write Pythagorean identities.

Q. Verify that $\sin^3\theta = \sin\theta - \sin\theta\cos^2\theta$.

Q. Verify that $\sqrt{\frac{\sec\theta + 1}{\sec\theta - 1}} = \frac{\sec\theta + 1}{\tan\theta}$

Q. Define class mark.

Q. Define a frequency distribution.

Q. What steps are involved in making a continuous frequency table?

Q. Calculate mean for 10, 15, 20, 25, 30, 35 using $\bar{x} = \frac{\Sigma x}{n}$.

Q. Define Measure of Dispersion.

Q. Convert $45.36°$ to Do M'S" form.

Q. What is difference between acute angle and obtuse angle?

Q. Define a secant line.

Q. Define Angle of depression.

Q. Find the distance covered by a point on the circumference of a wheel of radius 35 cm if he makes 3.5 revolution.

Q. Show that $\frac{\cot^2\alpha}{\operatorname{cosec}\alpha - 1}$

Q. Find without using table or calculator $\cos 540°$.

Q. Write the difference between segment of a circle and tangent to a circle.

Q. Write the definition of circumscribed circle.

Q. Define sector of a circle.

Q. If $\triangle ABC$ is an isosceles triangle right angled at C, prove that

$|\overline{AB}|^2 = 2|\overline{AC}|^2$

Q. What are collinear points? 2. What are congruent circles?

Q. Find the circumference of the circle of radius 4cm.

Q. Calculate the size of each angle of equilateral triangle.

Q. What is Phythagoras of theorem?

Q. What is the measure of the external angle of a regular octagon?

Subjective Part (Section – II)

Q. Solve the equation $x^2 - 3x - 4 = 0$ by completing square.

Q. Solve the following equations by completing square:

(i) $ax^2 + 4x - a = 0, a \neq 0$ (ii) $x^2 - 2x - 195 = 0$

Q. Solve the following equations using quadratic formula:

(i) $4x^2 - 14 = 3x$ (ii) $3x^2 + 8x + 2 = 0$

Q. Find k, if the roots of the equation

$(k + 3)x^2 + 2(k + 1)x + (k + 1) = 0$ are equal, if $k \neq -3$.

Q. Find the nature of the roots of the following given quadratic equations and verify the result by solving the equations:

(i) $2x^2 + 3x + 7 = 0$ (ii) $3x^2 + 7x - 13 = 0$

Q. Find the value of k, if the roots of the following equations are equal.

(i) $(2k - 1)x^2 + 3kx + 3 = 0$ (ii) $x^2 + 2(k + 2)x + (3k + 4) = 0$

Q. Prove that the sum of all the cube roots of unity is zero. i.e., $1 + \omega + \omega^2 = 0$

Q. Evaluate: (i) $(2 + 2\omega - 2\omega^2)(3 - 3\omega + 3\omega^2)$

(ii) $\left(-1 + \sqrt{-3}\right)^6 + \left(-1 - \sqrt{-3}\right)^6$

Q. Prove that $x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x + \omega y + \omega^2 z)(x + \omega^2 y + \omega z)$

Q. Find p, if the roots α, β of the equation $x^2 - 5x + p = 0$, satisfy the relation $2\alpha + 5\beta = 7$

Q. If α, β are the roots of the equation $x^2 - 7x + 9 = 0$, From an equation whose roots are 2α and 2β.

Q. By synthetic division, solve the equation

$x^4 - 49x^2 + 36x + 252 = 0$ having roots -2 and 6.

Q. The sum of the squares of three positive consecutive numbers is 77. Find them.

Q. Find the cost of 15kg of sugar, if 7 kg of sugar costs 560 rupees.

Q. Two numbers are in the ratio 5 : 8. If 9 is added to each number, we get a new ratio 8 : 11. Find the numbers.

Q. If 10 is added in each number of the ratio 4 : 13, we get a new ratio 1 : 2. What are numbers?

Q. Given that A varies directly as the square of r and $A = \frac{1782}{7}\ cm^2$, when r = 9cm. If r = 14cm, then find A.

Q. Find fourth proportional of $a^3 - b^3$, $a + b$ and $a^2 + ab + b^2$.

Q. If y varies inversely as x and y = 7 when x = 2, find y when x = 126.

Q. Find the fourth proportional to:

(i) $x^2 - 11x + 24, (x - 3), 5x^4 - 40x^3$

(ii) $p^3 + q^3, p^2 - q^2, p^3 - pq + q^2$

Q. Using theorem of componendo-dividendo, solve the equation

$$\frac{\sqrt{x+3}+\sqrt{x-3}}{\sqrt{x+3}-\sqrt{x-3}} = \frac{4}{3}$$

Q. p varies jointly as q and r^2 and inversely as s and t^2, p = 40, when q = 8, r = 5, s = 3, t = 2. Find p in terms of q, r, s and t. Also find the value of p when q = −2, r = 4, s = 3 and t = −1.

Q. The strength "s" of a rectangular beam varies directly as the breadth b and the square of the depth d. If a beam 9cm wide and 12 cm deep with support 1200lb. What weight a beam of 12cm wide and 9cm deep will support?

Q. If u varies directly as x^2 and inversely as the product yz^3, and u = 2 when x = 8, y = 7, z = 2. Find the value of u when x = 6, y = 3, z = 2

Q. In Hook's law the force F applied to stretch a spring varies directly as the amount of elongation S and F = 32lb when S = 1.6 in.

Find (i) S when F = 50lb (ii) F when S = 0.8 in.

Q. The time T required for an elevator to lift a weight varies jointly as the weight w and the lifting depth d varies inversely as the power p of the motor. If 25 sec. are required for a 4-hp motor to lift 500lb through 40ft, what power is required to lift 800lb, through 120ft in 40 sec?

Q. Commutative property of intersection

For any two sets A and B, prove that $A \cap B = B \cap A$

Q. De-Morgan's laws

For any two sets A and B, prove that

(i) $(A \cup B)' = A' \cap B'$ (ii) $(A \cap B)' = A' \cup B'$

Q. If L = {a, b, c}, M = {3, 4}, then find two binary relations of L × M and M × L.

Q. Make a Histogram for the following distribution of marks.

Class Boundaries	Frequency
−0.5 — 9.5	2
9.5 — 19.5	10
19.5 — 29.5	8
29.5 — 39.5	6
39.5 — 49.5	7
49.5 — 59.5	1

Q. Construct a cumulative frequency distribution for the following data.

Classes	20 – 24	25 – 29	30 – 34	35 – 39	40 – 44	45 – 49	50 – 54
Frequency	1	2	26	22	20	15	14

Q. The sug[illegible] contents for a random sample of 6 packs of juices of a certain brand are found to be 2.3, 2.7, 2.5, 2.9, 3.1 and 1.9 milligram. Find the median.

Q. Find the geometric mean for the following data:

Marks in percentage	Frequency/(No of Students)
33 – 40	28
41 – 50	31
51 – 60	12
61 – 70	9
71 – 75	5

Q. On a vacation trip a family bought 21.3 liters of petrol at 39.90 rupees per liter, 18.7 liters at 42.90 rupees per liter, and 23.5 liters at 40.90 rupees per liter. Find the mean price paid per liter.

Q. Compare the variation about mean for the two groups of students who obtained the following marks in Statistics.

X = Marks (section A)	Y = Marks sections B
60	62
70	62
30	65
90	68
80	67
40	48

Q. The length of 32 items are given below. Find the mean length and standard deviation of the distribution.

Length	20 – 22	23 – 25	26 – 28	29 – 31	32 – 34
Frequency	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Q. In a circle of radius 10m, find the distance travelled by a point moving on this circle if the point makes 3.5 revolution.

Q. If $\tan\theta = \frac{4}{3}$ and $\sin\theta < 0$, find the values of other trigonometric functions at θ.

Q. A tree casts a 40 meter shadow when the angle of elevation of the sun is 25°. Find the height of the tree.

Q. In any triangle, the square on the side opposite to acute angle is equal to sum of the squares on the sides containing that acute angle diminished by twice the rectangle contained by one of those sides and the projection on it of the other.

Q. In a parallelogram ABCD prove that $(\overline{AC})^2 + (\overline{BD})^2 = 2[(\overline{AB})^2 + (\overline{BC})^2]$.

Q. In a $\triangle ABC$, $m\angle A = 45^\circ$, prove that $(\overline{BC})^2 = (\overline{AB})^2 + (\overline{AC})^2 - \sqrt{2}\, m\overline{AB} \cdot m\overline{AC}$.

Q. Prove if a line is drawn perpendicular to a radial segment of a circle at its outer end point, it is tangent to the circle at that point.

Q. If C is the mid point of an arc ACB in a circle with centre O. Show that line OC bisects the chord AB.

Q. Show that parallelogram inscribed in a circle will be a rectangle.

Q. Construct a circle of radius 2cm. Draw two tagents making an angle of 60° with each other.

Q. Draw two common tangents to two touching circles of radii 2.5cm and 3.5cm.