

MILITARY COLLEGE SUI BALOCHISTAN
MATHEMATICS CLASS 10 TH
IMPORTANT QUESTIONS

Chapter No. 1		Quadratic Equations
Ser	Questions	
1.	Solve by factorization $4 - 32x = 17x^2$	
2.	Solve using quadratic formula $3x^2 + 8x + 2 = 0$	
3.	Solve by completing square $x^2 + 3x - 18 = 0$	
4.	Solve by factorization: $3(3x - 1)^2 = -2(3x - 1)$.	
5.	Solve $5x^{\frac{1}{2}} = 7x^{\frac{1}{4}} - 2$	
6.	Solve $x^4 - 2x^3 - 2x^2 + 2x + 1 = 0$	
7.	Solve $(x - 1)(x - 2)(x - 8)(x + 5) + 360 = 0$	
8.	Solve using quadratic formula $2x^2 + 7x + 3 = 0$.	
9.	Solve the equation $\sqrt{x + 11} + \sqrt{x + 3} = \sqrt{x + 18}$	
10.	Solve the equation $\sqrt{x + 1} + \sqrt{x - 2} = \sqrt{x + 6}$	
Chapter No. 2		Theory of Quadratic Equations
Ser	Questions	
1.	Show that $\omega^{52} + \omega^{53} + \omega^{54} = 0$ where ω is cube root of unity.	
2.	If α, β are the roots of $4x^2 - 12x - 7 = 0$ then find the equation whose roots are α^2, β^2	
3.	If α and β are the roots of the equation $3x^2 + 14x + 7 = 0$ then evaluate $\frac{1}{\alpha} + \frac{1}{\beta}$.	
4.	For all values of K, prove that the roots of the equation $x^2 - 2\left(k + \frac{1}{k}\right)x + 4 = 0$ are real.	
5.	Show that the equations $x^2 + (mx + c)^2 = a^2$ has equal roots if $c^2 = a^2(1 + m^2)$	
6.	Prove that $(1 + \omega)(1 + \omega^2)(1 + \omega^4)(1 + \omega^8) \dots \dots 2n \text{ factors} = 1$	
7.	prove that $x^3 + y^3 = (x + y)(x + \omega y)(x + \omega^2 y)$	
8.	Find p if The roots of the equation $x^2 + 3x + p - 2 = 0$ differ by 2	
9.	Find cube roots of -27	
10.	Evaluate $\omega^{-13} + \omega^{-17}$	
11.	Find k if sum of square of the roots of the equation $4kx^2 + 3kx - 8 = 0$ is 2.	
Chapter No. 3		Variations
Ser	Questions	
1.	If the ratios $3v-1:4+v$ and $2:5$ are equal. Find the value of v.	
2.	Given that $v \propto \frac{1}{r^3}$ and $v=4$, $r=3$ find v when $r=5$	

3.	Find m, if sum of the squares of the roots of the equation $x^2 + 6mx + 9 = 0$ is 18.
4.	Find mean proportional of $10x^6y^2, 40x^2y^4$
5.	The sum of two numbers is 15. If the sum of their reciprocal is $\frac{3}{10}$. Find the numbers.
6.	Find the price of 8kg mangoes, if price of 5kg mangoes is Rs 250.
7.	Using componendo and dividendo theorem find the value of $\frac{x+4y}{x-4y} + \frac{x-4z}{x+4z}$ if $x = \frac{4yz}{y+z}$
8.	Solve by using componendo and dividendo theorem. $\frac{\sqrt{x+3} + \sqrt{x-3}}{\sqrt{x+3} - \sqrt{x-3}} = \frac{3}{2}$
9.	Find the value of K, if the expression $x^2 - 2(K+1)x + K^2$ is a perfect square.
10.	If x varies directly as y and $x = 9$ when $y = 15$, find x when $y = 30$.

Chapter No. 4 Partial fractions

Ser	Questions
1.	Resolve into partial fraction $\frac{x+2}{(x-3)^2(x-1)}$
2.	Resolve into partial fraction $\frac{x^2}{(x+1)(x^2+1)^2}$
3.	Resolve into partial fraction $\frac{x+5}{(x+2)(x^2+2)}$
4.	Resolve into partial fractions. $\frac{(3x+8)}{(x+2)(x-3)}$
5.	Resolve into partial fraction $\frac{x^5}{(x^2+2)^2}$
6.	Resolve into partial fraction $\frac{x^2}{(x-1)(x^2+1)^2}$
7.	Resolve into partial fraction $\frac{x^2}{(x^2+2)^2}$

Chapter No. 5 Sets and Functions

Ser	Questions
1.	If $A = \{0,1,2\}$ and $B = \{-2, -1,0,1\}$ then find $A \times B, B \times A$ also write domain and range.
2.	If $X = \varphi, Y = Z^+, T = O^+$ then find (i) XUY , (ii) $X \cap T$
3.	If $U = \{1,2,3,\dots,10\}, A = \{1,3,5,7,9\}$ and $B = \{2,4,6,8,10\}$, then find $A^c \cap B^c$.
4.	State and prove De-Morgan's Laws
5.	Find the sets X and Y if $X \times Y = \{(a, a)(b, a)(c, a)(d, a)\}$
6.	If $U = N; A = \varphi$ and $B = P$ then verify De-Morgan's Laws.
7.	If $L = \{x/x \in N \text{ and } x \leq 5\}, M = \{y/y \in P \text{ and } y < 10\}$ then make the relation $R = \{(x, y) y - x = 2\}$

8.	If $U = \{1,2,3,4,5,6,7,8,9,10\}$, $A = \{1,3,5,7,9\}$ and $B = \{2,3,5,7\}$ then verify De-Morgan's Laws.
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Chapter No. 6 Basic Statistics

Ser	Questions														
1.	Define Range, AM, GM, HM, Mode and Median.														
2.	Find standard deviation. 9,3,8,8,9,8,9,18														
3.	Compute the geometric mean of the given data: <table border="1" style="margin-left: 20px;"> <tr> <td>Classes</td> <td>65-84</td> <td>85-104</td> <td>105-124</td> <td>125-144</td> <td>145-164</td> <td>165-184</td> </tr> <tr> <td>f</td> <td>3</td> <td>8</td> <td>19</td> <td>14</td> <td>9</td> <td>5</td> </tr> </table>	Classes	65-84	85-104	105-124	125-144	145-164	165-184	f	3	8	19	14	9	5
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f	3	8	19	14	9	5									
4.	Calculate variance of the following data 10,8,9,7,5,12,8,6,8,2														
5.	Find AM by direct and indirect method of the following data. 200,225,350,375,270,320,290														
6.	The salaries of five teachers are in rupees are as follows 11500, 12400, 15000, 14500, 14800 Find Range and standard deviation.														
7.	Find AM by direct and indirect method of the following data. 12,14,17,20,24,29,35,45														
8.	Find standard deviation. 12,6,7,3,15,10,18,5														
9.	Find the mean length and standard deviation of the distribution. <table border="1" style="margin-left: 20px;"> <tr> <td>length</td> <td>20-22</td> <td>23-25</td> <td>26-28</td> <td>29-31</td> <td>32-34</td> </tr> <tr> <td>f</td> <td>3</td> <td>6</td> <td>12</td> <td>9</td> <td>2</td> </tr> </table>	length	20-22	23-25	26-28	29-31	32-34	f	3	6	12	9	2		
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Chapter No. 7 Introduction to Trigonometry

Ser	Questions
1.	Show that $(\sec^2\theta - 1)^2 \cos^2\theta = \sin^2\theta$
2.	If a circle of radius 12m, Find the length of an arc which subtends a central angle $\theta = 1.5$ radians.
3.	Prove that $\frac{1-\tan^2\theta}{1+\tan^2\theta} = \cos^2\theta - \sin^2\theta$.
4.	Verify $\sin\theta(\tan\theta + \cot\theta) = \sec\theta$
5.	A vertical pole is 8m high and the length of its shadow is 6m. What is the angle of elevation of the sun at that moment?

6.	$\sec\theta - \cos\theta = \tan\theta\sin\theta$
7.	Convert the following Angles to D ^o M S forms (1) 35.37 ^o (2) 47.2537 ^o
8.	When the angle of elevation of the Sun is 60 degree, a tree casts a shadow 24m long. What is the height of the tree?
9.	Find the angle of elevation of the sun if a 6 feet man casts a 3.5 feet shadow.
10.	Find θ when $l = 25$ cm, $r = 3.2$ cm

Chapter No. 8 Projection of a Side of a Triangle

Ser	Questions
1.	In an obtuse angled triangle, the square on the side opposite to the obtuse angle is equal to the sum of the square on the sides containing the obtuse angle together with twice the rectangle contained by one of the sides, and the projection on it of the other.
2.	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.
3.	In any triangle, the sum of squares on any two sides is equal to twice the square on half the third side together with twice the square on the median which bisect the third side.

Chapter No. 9 Chords of a Circle

Ser	Questions
1.	One and only one circle can pass through three non collinear points
2.	A line segment drawn from the center of the circle which bisect the chord (which is not a diameter) is perpendicular to the chord.
3.	Perpendicular from the centre of a circle on a chord bisects it.

Chapter No. 10 Tangent of a Circle

Ser	Questions
1.	Two tangents drawn to a circle from a point outside it is equal in length.
2.	The tangent to a circle and radial segment joining the point of contact and the centre are perpendicular to each other.
3.	If two circles touch externally then the distance between their centres is equal to the sum of their radii.

Ser No. 11 Chords and Circles

Ser	Questions
1.	If two arcs of a circle are congruent then the corresponding chords are equal.
2.	If the angles subtended by two chords of a circle at the centre are equal, the chords are equal.
3.	Equal chords of a circle subtended equal angles at the centre.

Chapter No. 12 Angles in a segment of Circle

Ser	Questions
1.	The measure of central angle of a minor arc of a circle, is double that of angle subtended by the correspondence major arc
2.	Any two angles in the same segment of a circle are equal.
3.	The angle in a semi circle is a right angle.

Chapter No. 13 Practical Geometry- Circles

Ser	Questions
1.	Divide an arc of any length into four equal parts.
2.	For an arc draw two perpendicular bisectors of the chords PQ and QR of this arc, construct a circle through P, Q and R.
3.	Inscribe a circle in a triangle ABC with sides $mAB = 5\text{cm}$, $mBC = 3\text{cm}$ $mCA = 3\text{cm}$ Also measure its in-radius.
4.	Describe a circle of radius 5 cm passing through points A and B, 6cm apart, also find the distance from the centre to the line segment AB.
5.	If $mPQ = 3\text{cm}$ and $mQR = 5\text{cm}$ such that mPQ is perpendicular to mQR construct a circle passing through points P, Q, R.
6.	In an around the circle of radius 4 cm draw a square.
7.	Circumscribe a regular hexagon about the circle of radius 3cm.
8.	Draw two perpendicular tangents to a circle of radius 3cm.
9.	Circumscribe a circle about a triangle ABC with sides $mAB = 6\text{cm}$, $mBC = 3\text{cm}$ $mCA = 4\text{cm}$