

AL HUDA SCIENCE ACADEMY

Prepared By: Sir Muhammad Usman Ali

Guess Paper of Mathematics Class 9th

اللہ سب کو سچ کہنے کی ہمت عطا فرمائیں۔ آمین

Visit Our YouTube Channel
for Easy Maths

<https://youtube.com/@AhsaDotPk>

Question No. 2

1. Represent the following number on number line: $-2\frac{1}{7}$
2. Represent the following number on number line: $2\frac{3}{4}$
3. Express the following as a rational number $\frac{p}{q}$ where p and q are integers and $q \neq 0$: 0.4
4. Express the following as a rational number $\frac{p}{q}$ where p and q are integers and $q \neq 0$: 0.37
5. Name the property used in the following: $a(b + c) = ab + ac$
6. Insert two rational numbers between: $\frac{1}{3}$ and $\frac{1}{4}$
7. Insert two rational numbers between: 3 and 4
8. Express the following recurring decimal as the rational number $\frac{p}{q}$ where p and q are integers: 0.93
9. Rationalize the denominator of the following: $13 / (4 + \sqrt{3})$
10. Rationalize the denominator of the following: $(\sqrt{3} - \sqrt{2}) / (\sqrt{3} + \sqrt{2})$
11. Rationalize the denominator of the following: $4\sqrt{3} / (\sqrt{7} + \sqrt{5})$
12. Simplify the following: $(81/16)^{-3/4}$
13. Simplify the following: $(3/4)^{-2} \div (4/9)^3 \times (16/27)$
14. Simplify the following: $(0.027)^{-1/3}$
15. Simplify the following: $\sqrt[7]{(x^{14} \cdot y^{24} \cdot z^{35}) / (y^{14} \cdot z^7)}$
16. Simplify the following: $(64)^{-2/3} \div (9)^{-3/2}$
17. If $x = 3 + \sqrt{8}$, then find the value of: $(x - 1/x)^2$
18. If $x = 3 + \sqrt{8}$, then find the value of: $x + 1/x$
19. If $x = 3 + \sqrt{8}$, then find the value of: $x - 1/x$
20. Define surd.
21. Simplify the following: $\sqrt[4]{16x^4y^8}$
22. Simplify the following: $\sqrt[3]{27x^6y^9z^3}$
23. Simplify the following: $\sqrt[3]{(27)^{2x}}$
24. Rationalize the denominator of: $3 / (\sqrt{5} - \sqrt{3})$
25. If $a = 3/2$, $b = 5/3$ and $c = 7/5$, then verify that: $(a + b)c = ac + bc$
26. Simplify the following: $\sqrt[5]{(x^{15}y^{35}) / z^{20}}$
27. Simplify the following: $[6(3)^{(n+2)}] / [3^{(n+1)} - 3^n]$

28. Express the following number in scientific notation: 0.0042
29. Express the following number in scientific notation: 0.0000009
30. Express the following number in ordinary notation: 8.04×10^2
31. Express the following number in ordinary notation: 1.5×10^{-2}
32. The speed of light is approximately 3×10^8 metres per second. Express it in standard form.
33. The circumference of the Earth at the equator is about 40,075,000 metres. Express this number in scientific notation.
34. The diameter of Earth is 1.2756×10^4 km. Express this number in standard form.
35. Define scientific notation.
36. Convert 6.23×10^{-4} to ordinary notation.
37. Express the following in logarithmic form: $3^{-3} = 1/27$
38. Express the following in logarithmic form: $p = q^r$
39. Express the following in logarithmic form: $(32)^{-1/5} = 1/2$
40. Express the following in exponential form: $\log_4(1/16) = -2$
41. What do you mean by logarithm?
42. Write the general form of logarithm.
43. Find the value of x: $\log x = 4.3561$
44. Find the value of x: $\log x = 2.0184$
45. Define common logarithm.
46. Define mantissa.
47. Define reference position.
48. Define antilogarithm.
49. Define natural logarithm.
50. Find the value of x in the following: $\log x = 0.2568$
51. Find the value of x in the following: $\log x = -1.4567$
52. Express the following number in scientific notation: 0.000567
53. Find the value of x in the following: $\log_9 x = 0.5$
54. Write the following set in set-builder notation: $\{0, \pm 1, \pm 2, \dots, \pm 1000\}$
55. Write the following set in set-builder notation: $\{100, 102, 104, \dots, 400\}$

56. Write the following set in set-builder notation: $\{5, 10, 15, \dots, 100\}$
57. Write the following set in set-builder notation: The set of all integers between -100 and 1000
58. Write the following set in tabular form: $\{x \mid x = 2n, n \in \mathbb{N}\}$
59. Write the following set in tabular form: $\{x \mid x = 2m + 1, m \in \mathbb{N}\}$
60. Write the following set in tabular form: $\{x \mid x \in \mathbb{Q} \wedge x^2 = 2\}$
61. Write two proper subsets of the following set: $\{a, b, c\}$
62. Write two proper subsets of the following set: $\{0, 1\}$
63. What is the difference between $\{a, b\}$ and $\{\{a, b\}\}$?
64. What is the number of elements of the power set of: $\{1, 2, 3, 4, 5, 6, 7\}$
65. What is the number of elements of the power set of: $\{0, 1, 2, 3, 4, 5, 6, 7\}$
66. What is the number of elements of the power set of: $\{a, \{b, c\}\}$
67. What is the number of elements of the power set of: $\{\{a, b\}, \{b, c\}, \{d, e\}\}$
68. Write down the power set of the following set: $\{+, -, \times, \div\}$
69. Write down the power set of the following set: $\{a, \{b, c\}\}$
70. Define equal set.
71. Define equivalent set.
72. Define subset.
73. Define proper subset.
74. Define universal set.
75. Define power set.
76. Verify the commutative properties of union and intersection for the following pairs of sets: $A = \{1, 2, 3, 4, 5\}$, $B = \{4, 6, 8, 10\}$
77. Verify the commutative properties of union and intersection for the following pairs of sets: $A = \{x \mid x \text{ is a prime number less than } 10\}$, $B = \{x \mid x \text{ is an odd number less than } 10\}$ (set given in original text was incomplete — confirm with your teacher/textbook)
78. If $U = \{1, 2, 3, \dots, 20\}$ and $A = \{1, 3, 5, \dots, 19\}$, verify the following: $A \cup A' = U$
79. If $U = \{1, 2, 3, \dots, 20\}$ and $A = \{1, 3, 5, \dots, 19\}$, verify the following: $A \cap U = A$
80. Define difference of two sets.
81. Define overlapping set.
82. Define De Morgan's law.

83. Consider the set $P = \{x \mid x = 5m, m \in \mathbb{N}\}$ and $Q = \{x \mid x = 2m, m \in \mathbb{N}\}$, then find $P \cap Q = ?$
84. Factorize by identifying common factors: $15y^2 + 20y$
85. Factorize and represent pictorially: $5x + 15$
86. Factorize: $x^2 + x - 12$
87. Factorize: $x^2 - x - 56$
88. Factorize: $x^2 - 10x - 24$
89. Factorize: $x^2 - x - 2$
90. Factorize: $3y^2 - 11y + 6$
91. Factorize: $4z^2 - 11z + 6$
92. Define quadratic equations.
93. Factorize: $p^2 + 11p + 18$
94. Factorize: $125a^3 - 1$
95. Factorize: $x^6 - 27$
96. Factorize: $1000a^3 + 1$
97. Factorize: $27 - 512y^3$
98. Factorize: $8x^3 + 60x^2 + 150x + 125$
99. Factorize: $8x^3 + 27$
100. Factorize: $x^3 - 27y^3$
101. Find HCF by factorization method: $21x^2y, 35xy^2$
102. Find HCF by factorization method: $4x^2 - 9y^2, 2x^2 - 3xy$
103. Find HCF by factorization method: $x^3 - 1, x^2 + x + 1$
104. Find HCF by factorization method: $t^2 + 3t - 4, t^2 + 5t + 4, t^2 - 1$
105. Find LCM of the following expressions by using prime factorization method: $2a^2b, 4ab^2$
106. Find LCM of the following expressions by using prime factorization method: $a^2 - 4a + 4, a^2 - 2a$
107. Define H.C.F.
108. Define L.C.M.
109. How many methods are there to solve H.C.F.?
110. Find the HCF of $6x^2y, 9xy^2$

111. Find the LCM of $4x^2y$, $8x^3y^2$
112. Factorize the following: $4x^3 + 18x^2 - 12x$
113. Factorize the following: $x^3 + 64y^3$
114. Factorize the following: $x^3y^3 - 8$
115. Factorize the following: $-x^2 - 23x - 60$
116. Factorize the following: $2x^2 + 7x + 3$
117. Find LCM and HCF by prime factorization method: $x^2 + 8x + 16$, $x^2 - 16$
118. Solve and represent the solution on a real line: $x/3 + 6 = -12$
119. Solve and represent the solution on a real line: $x/2 - 3x/4 = 1/12$
120. Solve the following inequality and represent the solution on a real line: $6(x + 10) \leq 0$
121. Solve the following inequality and represent the solution on a real line: $(5/3)x - 3/4 < -1/12$
122. Shade the solution region for the following linear inequality in the xy-plane: $3x + 7y \geq 21$
123. Shade the solution region for the following linear inequality in the xy-plane: $5x - 4y \leq 20$
124. Define linear inequality.
125. Solve the following equation and represent their solution on a real line: $(x-2)/5 - (x-4)/2 = 2$
126. Find the solution of $(2/3)x - 1 < 0$ and also represent it on a real line.
127. Solve the inequality: $x + 2y < 6$
128. Solve and represent their solutions on a real line: $(x+5)/3 = 1 - x$
129. Solve and represent their solutions on a real line: $3x + 7 < 16$

Question No. 3

1. Convert the following into degrees, minutes, and seconds: 123.456°
2. Convert the following into degrees, minutes, and seconds: 90.5678°
3. Convert the following into decimal degrees: $65^\circ 32' 15''$
4. Convert the following into decimal degrees: $78^\circ 45' 36''$
5. Convert the following into degrees: $(11\pi/5)$ rad
6. Find the arc length and area of a sector if: $r = 6$ cm and central angle $\theta = \pi/3$ radians.

7. Find the arc length and area of a sector if: $r = 4.8/\pi$ and central angle $\theta = 5\pi/6$
8. Find the percentage of the area of a sector subtending an angle of $\pi/8$ radians.
9. Define right angle.
10. Define radian.
11. Convert degree to radian: $15^\circ 15'$
12. Find the arc length of a sector with radius $r = 10$ cm and central angle $\theta = 60^\circ$
13. If θ lies in the first quadrant, find the remaining trigonometric ratios of θ : $\cos \theta = 3/4$
14. If θ lies in the first quadrant, find the remaining trigonometric ratios of θ : $\cot \theta = \sqrt{3/2}$
15. Prove the following trigonometric identity: $\cos \theta / \sin \theta = 1 / \tan \theta$
16. Prove the following trigonometric identity: $\cos^2 \theta - \sin^2 \theta = 2\cos^2 \theta - 1$
17. Show that: $(\sec^2 \theta - 1)\cos^2 \theta = \sin^2 \theta$
18. Show that: $\tan \theta + \cot \theta = \sec \theta \cdot \operatorname{cosec} \theta$
19. Find the value of the following trigonometric ratio without using a calculator: $\sec 60^\circ$
20. Find the value of the following trigonometric ratio without using a calculator: $\cos(\pi/3)$
21. Evaluate: $2 \sin 60^\circ \cos 60^\circ$
22. If $\sin(\pi/4)$ and $\cos(\pi/4)$ equal $1/\sqrt{2}$ each, then find the value of the following: $2\sin 45^\circ - 2\cos 45^\circ$
23. If $\sin(\pi/4)$ and $\cos(\pi/4)$ equal $1/\sqrt{2}$ each, then find the value of the following: $3\cos 45^\circ + 4\sin 45^\circ$
24. Find the value of x , y , and z from the given right-angled triangle ($\angle A = 45^\circ$, $y = 4$ cm — right angle at B).
25. Find the value of x , y , and z from the given right-angled triangle ($\angle C = 60^\circ$, hypotenuse = 2 cm — right angle at B).
26. Find the value of x , y , and z from the given right-angled triangle ($\angle A = 45^\circ$, $y = 4$ cm — right angle at B).
27. Each side of a square field is 60 m long. Find the length of the diagonal of the field.
28. Solve triangle ABC when $m\angle A = 60^\circ$, $b = 5$ cm, $m\angle B = 90^\circ$
29. Solve triangle ABC when $a = 2$ cm, $b = 2\sqrt{2}$ cm, and $m\angle B = 90^\circ$
30. Convert the given angle from radians to degrees, giving the answer in degrees and minutes:
 $17\pi/24$
31. Convert the given angle from radians to degrees, giving the answer in degrees and minutes:
 $11\pi/16$

32. Find the distance between the points: $C(-5, -2)$, $D(3, 2)$
33. Find the distance between the points: $L(0, 3)$, $M(-2, -4)$
34. Find the distance between the points: $P(-8, -7)$, $Q(0, 0)$
35. Find the midpoint of the line segment joining the two points: $A(-8, 3)$, $B(2, -1)$
36. Find the midpoint of the line segment joining the two points: $A(-\sqrt{5}, -3)$, $B(-3\sqrt{5}, 5)$
37. Is the following point at a distance of 15 units from the origin? $(\sqrt{176}, 7)$
38. Find h such that $A(-1, h)$, $B(3, 2)$, and $C(7, 3)$ are collinear.
39. The points $A(-5, -2)$ and $B(5, -4)$ are ends of a diameter of a circle. Find the centre and radius of the circle.
40. Define coordinate plane.
41. Define abscissa and ordinate.
42. What is the distance formula?
43. What is the midpoint formula?
44. Find the distance between the points: $A(5, 6)$, $B(5, -2)$
45. Show that the points $A(-1, 2)$, $B(7, 5)$, $C(2, -6)$ are vertices of a right triangle.
46. The point $C(-5, 3)$ is the centre of a circle and $P(7, -2)$ lies on the circle. What is the radius of the circle?
47. Find the midpoint of the line segment joining the points $A(2, 3)$ and $B(8, 7)$.
48. Find the slope and inclination of the line joining the points: $(3, -2)$ and $(2, 7)$
49. By means of slope, show that the following points lie on the same line: $A(-1, -3)$, $B(1, 5)$, $C(2, 9)$
50. Find an equation of the horizontal line through: $(7, -9)$
51. Find an equation of the line through $A(-6, 5)$ having slope 7.
52. Find an equation of the line through $(8, -3)$ having slope 0.
53. Find an equation of the line through $(-8, 5)$ having slope undefined.
54. Find an equation of the line through $(-5, -3)$ and $(9, -1)$.
55. Find an equation of the line with y-intercept: -7 and slope: -5
56. Find an equation of the line with x-intercept: -3 and y-intercept: 4
57. Find an equation of the line with x-intercept: -9 and slope: -4
58. Find an equation of the line through $(-4, -6)$ and perpendicular to a line having slope $-3/2$

59. Check whether the two lines are (i) parallel (ii) perpendicular (iii) neither parallel nor perpendicular: $2x + y - 3 = 0$; $4x + 2y + 5 = 0$
60. Check whether the two lines are (i) parallel (ii) perpendicular (iii) neither parallel nor perpendicular: $4y + 2x - 1 = 0$; $x - 2y - 7 = 0$
61. What is the slope (gradient) of a line?
62. Define collinear points.
63. What is the intercept form of a line?
64. Show that the points A(-3, 6), B(3, 2), and C(6, 0) are collinear.
65. Find the distance between two points A(2, 3) and B(7, 8) on a coordinate plane.
66. Find the midpoint of the line segment joining the points (4, -2) and (-6, 3).
67. Find the value of x in the given figure (triangle with AB = 7.5 cm, EC = 3 cm, $CD \perp BC$, right angle shown at D and C).
68. Find the value of x in the given figure (triangle with parallel lines, BC = 6 cm, BD = 5.1 cm).
69. Find the value of x in the given figure (two intersecting line segments with CD = 2.5 cm, FG = 3.6 cm).
70. A plank is placed straight upstairs that is 20 cm wide and 16 cm deep. A rectangular box of height 8 cm and width x cm is placed on a stair under the plank. Find the value of x.
71. Find the value of x, y, and z in the given figure (right triangle with altitude 7 cm and base 10 cm).
72. Define polygon.
73. Define similar polygons.
74. Define similar triangles.
75. Find the ratio of the areas of similar figures if the ratio of their corresponding lengths is: 1:3
76. Find the ratio of the areas of similar figures if the ratio of their corresponding lengths is: 3:4
77. Find the ratio of the areas of similar figures if the ratio of their corresponding lengths is: 8:9
78. Find the unknown (A_2) in the given figure: $A_1 = 240 \text{ cm}^2$ (base 10 cm), find A_2 for a similar figure with base 6 cm.
79. Find the unknown (A_2) in the given figure: $A_1 = 60 \text{ cm}^2$ (base 15 cm), find A_2 for a similar figure with base 20 cm.
80. Find the unknown (A_1) in the given figure: base 3.6 cm, $A_2 = 18 \text{ cm}^2$ (base 5.76 cm).
81. The areas of two similar triangles are 16 cm^2 and 25 cm^2 . What is the ratio of a pair of corresponding sides?
82. Two right cones have volumes in the ratio 64:125. What is the ratio of their base areas?

83. Find the missing value (V_1) in the given similar solid: $h_1 = 2.5$ m, $h_2 = 8.75$ m, $V_2 = 171.5$ cm³.
84. Find the missing value (V_1) in the given similar solid: $A_1 = 392$ cm², $A_2 = 162$ cm², $V_2 = 729$ cm³.
85. The ratio of the corresponding lengths of two similar conical cans is 3:2. The smaller conical can has a volume of 240 m³. Find the volume of the larger conical can.
86. The ratio of the heights of two similar cylindrical water tanks is 5:3. If the volume of the smaller tank is 270 cubic metres, find the volume of the larger tank.
87. Find the unknown volume (V_1) in the given similar solid: side = 5 cm, side = 7 cm, $V_2 = 686$ cm³.
88. The sum of the interior angles of a polygon is 1080°. How many sides does the polygon have?
89. Two similar bottles are such that one is twice as high as the other. What is the ratio of their surface areas and their capacities?
90. Each dimension of a model car is $\frac{1}{10}$ of the corresponding car dimension. Find the ratio of the capacities of their boots.
91. Each dimension of a model car is $\frac{1}{10}$ of the corresponding car dimension. Find the ratio of the number of wheels they have.
92. A toy manufacturer produces model cars that are similar in every way to the actual cars. If the ratio of the door area of the model to the door area of the car is 1 cm² to 2500 cm², find the width of the model, if the actual car is 150 cm wide.
93. The ratio of the areas of two similar labels on two similar jars of coffee is 144:169. Find the ratio of the heights of the two jars.

Question No. 4

1. Sketch the graph of the following linear function: $y = 3x - 5$
2. Sketch the graph of the following linear function: $y = 0.5x - 1$
3. What is the general form of a linear function?
4. What is a cubic function?
5. What is an exponential function?
6. What is a reciprocal function?
7. Plot the graph of the following function: $y = 3^{-x}$ for x from -2 to 4 .
8. Plot the graph of the following function: $y = 2/(x+7)$, $x \neq -7$
9. Plot the graph of the following for x from -5 to 5 : $y = x^2 - 3$
10. Plot the graph of the following for x from -5 to 5 : $y = 15 - x^2$

11. Construct $\triangle ABC$ with the given measurements and verify that the perpendicular bisectors of the triangle are concurrent: $mAB = 7.1$ cm, $m\angle B = 135^\circ$, $mBC = 6.5$ cm.
12. Construct $\triangle LMN$ with the following measurements and verify that the medians of the triangle are concurrent: $mMN = 4.8$ cm, $m\angle N = 30^\circ$, $mLM = 8.1$ cm.
13. Verify that the angle bisectors of $\triangle ABC$ are concurrent with the following measurements: $mAB = 6$ cm, $m\angle A = 150^\circ$, $m\angle B = 60^\circ$
14. What is a triangle?
15. What is a perpendicular bisector?
16. Define a median of a triangle.
17. Define point of concurrency.
18. Define circumcenter of a triangle.
19. Define centroid of a triangle.
20. Define incentre of a triangle.
21. What is the altitude of a triangle?
22. Define equilateral triangle.
23. Define isosceles triangle.
24. Define scalene triangle.
25. Define acute-angled triangle.
26. Define obtuse-angled triangle.
27. Define right-angled triangle.
28. Construct a triangle of sides 5.3 cm, 5.9 cm, and 6.2 cm.
29. Construct a triangle BCD in which the measures of two sides are 5.5 cm and 4.2 cm and the measure of their included angle is 60° .
30. Differentiate between discrete and continuous data.
31. Define ungrouped data.
32. Define grouped data.
33. Define class limit.
34. Define frequency.
35. Define class boundary.
36. What is a histogram?

37. Find the arithmetic mean of the following: 4, 6, 10, 12, 15, 20, 25, 28, 30
38. Find the arithmetic mean of the following: 12, 18, 19, 0, -19, -18, -12
39. Find the arithmetic mean of the following: 6.5, 11, 12.3, 9, 8.1, 16, 18, 20.5, 25
40. Find the arithmetic mean of the following: 8, 10, 12, 14, 16, 20, 22
41. The following are the heights (in inches) of 12 students. Find the median height: 55, 53, 54, 58, 60, 61, 62, 56, 57, 52, 51, 63
42. The following are the earnings (in Rs) of ten workers: 88, 70, 72, 125, 115, 95, 81, 90, 95, 90. Calculate the Arithmetic Mean.
43. The following are the earnings (in Rs) of ten workers: 88, 70, 72, 125, 115, 95, 81, 90, 95, 90. Calculate the Median.
44. The following are the earnings (in Rs) of ten workers: 88, 70, 72, 125, 115, 95, 81, 90, 95, 90. Calculate the Mode.
45. The arithmetic mean of 45 numbers is 80. Find their sum.
46. Five numbers are 1, 4, 0, 7, 9. Find their mean, median, and mode.
47. A set of data contains the values 148, 145, 160, 157, 156, 160. Show that Mode > Median > Mean.
48. Define midpoint or class mark.
49. Define arithmetic mean.
50. Define median.
51. Define mode.
52. Define weighted mean.
53. The marks of a student in five examinations were 64, 75, 81, 87, 90. Find the arithmetic mean of the marks.
54. Find the arithmetic mean using the short formula for the runs made by a batsman: 40, 45, 50, 52, 50, 60, 56, 70
55. The following are the scores made by a batsman. Find the median of the data: 8, 12, 18, 13, 16, 5, 50
56. The following are the marks out of 100 obtained by 10 students in English: 23, 15, 35, 48, 41, 5, 8, 9, 11, 51. Find the median of the data.
57. The marks of Jamal in Mathematics in eight monthly tests were 75, 76, 80, 80, 82, 82, 82, 85. Find the mode of the marks.
58. Ten students were asked about the number of questions they solved out of 20 questions last week. The records were: 13, 14, 15, 11, 16, 10, 19, 20, 18, 17. Find the mode of the data.

59. Define frequency distribution.
60. Define mean.
61. Define median.
62. The marks of a student, Saad, in six tests were 84, 91, 72, 68, 87, 78. Find the arithmetic mean of his marks.
63. Usman rolled a fair die eight times. Each time their sum was recorded as: 8, 5, 6, 6, 9, 4, 3, 11. Find the median and mode of the sums.
64. Arshad rolls a die with sides labelled L, M, N, O, P, U. What is the probability that the die lands on a consonant?
65. Shazia throws a pair of fair dice. What is the probability of getting: sum of dots is at least 4?
66. Shazia throws a pair of fair dice. What is the probability of getting: product of both dots between 5 and 10?
67. One letter is selected at random from the word "MATHEMATIC". Find the probability of getting a vowel.
68. One letter is selected at random from the word "MATHEMATIC". Find the probability of not getting M.
69. Aslam rolled a die. What is the probability of getting the number 3 or 4? Also find the probability of not getting the number 3 or 4.
70. Abdul Hadi labelled cards from 1 to 30 and put them in a box. He selects a card at random. What is the probability that the selected card contains a number between 17 and 22?
71. Abdul Hadi labelled cards from 1 to 30 and put them in a box. He selects a card at random. What is the probability that the selected card contains a number at least 20?
72. The probability that Ayesha will pass the examination is 0.85. What is the probability that Ayesha will not pass the examination?
73. A card is selected at random from a well-shuffled pack of 52 playing cards. What is the probability of selecting a queen?
74. A card is chosen at random from a pack of 52 playing cards. Find the probability of getting a jack.
75. A card is chosen at random from a pack of 52 playing cards. Find the probability of getting a card that is not a diamond.
76. Define probability.
77. What is an experiment in probability?
78. What is a favourable outcome?
79. What is a sample space?

80. What is an event?
81. What is meant by the complement of an event?
82. Abdul Rehman rolls a fair die. What is the probability of getting a number divisible by 3?
83. Zeeshan rolled two fair dice. Find the probability of getting even numbers on both dice.
84. Zeeshan rolled two fair dice. Find the probability of getting multiples of 3 on both dice.
85. Zubair rolls a die. What is the probability of not getting the number 6?
86. Two fair dice are rolled. What is the probability of not getting a double six?
87. A bag contains 5 blue balls and 8 green balls. Find the probability of selecting at random a ball that is not green.
88. The researcher collected data on the number of deaths from horse kicks in the Russian Army corps over the years. Find the relative frequency of the given data:

No. of deaths	0	1	2	3	4	5	6
Frequency	60	50	84	40	32	15	10

89. A quiz competition on general knowledge is conducted. The number of correct answers out of 5 questions for 100 sets is given below. Find the relative frequencies:

X	0	1	2	3	4	5
f	10	23	15	25	18	9

90. A survey was conducted among 108 students of a class about their favourite food. What percentage of students like biryani?

Food item	Biryani	Fresh Juice	Chicken	Bar-B-Q	Sweets
No. of students	40	07	21	15	25

91. What is relative frequency?
92. A survey was conducted on 80 students of Grade IX about their favourite colour. Pink colour = 25 students. Find the relative frequency.
93. Abdul Rehman obtained different marks in different subjects out of 100 marks. Find the relative frequency of the given data:

Subject	Urdu	English	Islamiyat	Mathematics	Science	Computer Science
Marks Obtained	75	80	72	95	81	85

Subjective Part-II

Question No. 5

Visit Our Website: [Ahsa.Pk](https://www.ahsa.pk) for more notes, mcqs, guess papers, schemes, and more

Visit Our YouTube Channel: <https://youtube.com/@ahsadotpk>

1. Simplify the following: $[5 \cdot (25)^{(n+1)} - 25 \cdot (5)^{(2n)}] / [5 \cdot (5)^{(2n+3)} - (25)^{(n+1)}]$
2. Simplify the following: $[(16)^{(x+1)} + 20(4)^{(2x)}] / [2^x(x-3) \times 8^x(x+2)]$
3. Simplify the following: $[5^{(n+3)} - 6 \cdot 5^{(n+1)}] / [9 \times 5^n - 2^n \times 5^n]$
4. If $x = 3 + \sqrt{8}$, then find the value of: $x^4 + 1/x^4$
5. Find the rational numbers p and q such that: $(8 - 3\sqrt{2}) / (4 + 3\sqrt{2}) = p + q\sqrt{2}$
6. Simplify the following: $[54 \times \sqrt[3]{(27)^{(2x)}}] / [9^x(x+1) + 216(3^x(2x-1))]$
7. Simplify the following: $[(25)^{(3/2)} \times (243)^{(3/5)}] / [(16)^{(5/4)} \times (8)^{(4/3)}]$
8. Simplify the following: $\sqrt{\{(216)^{(2/3)} \times (25)^{(1/2)}\} / (0.04)^{(-3/2)}}$
9. Simplify the following: $(a^{(1/3)} + b^{(2/3)}) \times (a^{(2/3)} - a^{(1/3)}b^{(2/3)} + b^{(4/3)})$
10. Find the value of x: $\log x = -1.5726$

Question No. 6

1. In a class of 55 students, 34 like to play cricket and 30 like to play hockey. Also, each student likes to play at least one of the two games. How many students like to play both games?
2. In a group of 500 employees, 250 can speak Urdu, 150 can speak English, 50 can speak Punjabi, 40 can speak Urdu and English, 30 can speak both English and Punjabi, and 10 can speak Urdu and Punjabi. How many can speak all three languages?
3. In a training session, 17 participants have laptops, 11 have tablets, 9 have laptops and tablets, 6 have laptops and books, and 4 have both tablets and books. Eight participants have all three items. The total number of participants with laptops, tablets, or books is 35. How many participants have books?
4. There are 95 secondary school students in a sports club. 58 students join the swimming club, and 50 join the tug-of-war club. How many students participated in both games?
5. Verify De Morgan's Laws for the following sets: $U = \{1, 2, 3, \dots, 20\}$, $A = \{2, 4, 6, \dots, 20\}$, and $B = \{1, 3, 5, \dots, 19\}$.
6. Factorize the following expression: $x^4 - 30x^2y^2 + 9y^4$
7. Factorize the following expression: $x^4 - 7x^2y^2 + y^4$
8. Factorize the following expression: $(x + 2)(x - 7)(x - 4)(x - 1) + 17$
9. Factorize the following expression: $(x + 1)(x + 2)(x + 3)(x + 6) - 3x^2$
10. Factorize: $a^4 + 64$
11. Find HCF by factorization method: $a^3 + 2a^2 - 3a$, $2a^3 + 5a^2 - 3a$
12. Find HCF of the following expressions by using the division method: $27x^3 + 9x^2 - 3x - 10$, $3x - 2$

13. Find HCF of the following expressions by using the division method: $x^3 - 9x^2 + 23x - 15$, $x^2 - 4x + 3$
14. Find LCM of the following expressions by using the prime factorization method: $x^4 - 16$, $x^3 - 4x$
15. The HCF of two polynomials is $y - 7$ and their LCM is $y^3 - 10y^2 + 11y + 70$. If one of the polynomials is $y^2 - 5y - 14$, find the other.
16. The LCM and HCF of two polynomials $p(x)$ and $q(x)$ are $36x^3(x + a)(x^3 - a^3)$ and $x^2(x - a)$ respectively. If $p(x) = 4x^2(x^2 - a^2)$, find $q(x)$.
17. The HCF and LCM of two polynomials are $(x + a)$ and $12x^2(x + a)(x^2 - a^2)$ respectively. Find the product of the two polynomials.
18. The LCM of $x^2y + xy^2$ and $x^2 + xy$ is $xy(x + y)$. Find the HCF.
19. Factorize the following: $x^4 + 64$
20. Factorize the following: $(x^2 + 6x + 3)(x^2 + 6x - 9) + 36$
21. Find LCM and HCF by prime factorization method: $4x^3 + 12x^2$, $8x^2 + 16x$
22. Find LCM and HCF by prime factorization method: $x^3 + 3x^2 - 4x$, $x^2 - x - 6$

Question No. 7

1. Indicate the solution region of the following linear inequalities by shading: $2x - 3y \leq 6$, $2x - 3y \leq 12$
2. Indicate the solution region of the following linear inequalities by shading: $3x + 7y \geq 21$, $x - y \leq 2$
3. Indicate the solution region of the following linear inequalities by shading: $3x + 7y \geq 21$, $y \leq 4$
4. Indicate the solution region of the following linear inequalities by shading: $5x + 7y \leq 35$, $x - 2y \leq 2$
5. If the central angle of a sector is 60° and the radius of the circle is 12 cm, find the area of the sector and the percentage of the total area of the circle it represents.
6. If θ lies in the first quadrant, find the remaining trigonometric ratios of θ : $\tan \theta = 1/2$
7. Prove the following trigonometric identity: $(\sin \theta + \cos \theta)^2 = 1 + 2 \sin \theta \cos \theta$
8. Prove the following trigonometric identity: $\sin \theta / \operatorname{cosec} \theta + \cos \theta / \sec \theta = 1$
9. Prove the following trigonometric identity: $(1 - \sin \theta) / \cos \theta = \cos \theta / (1 + \sin \theta)$
10. Prove the following trigonometric identity: $(\sec \theta - \tan \theta)^2 = (1 - \sin \theta) / (1 + \sin \theta)$
11. Prove the following trigonometric identity: $(\tan \theta + \cot \theta)^2 = \sec^2 \theta \cdot \operatorname{cosec}^2 \theta$
12. Show that: $\sin^6 \theta + \cos^6 \theta = 1 - 3 \sin^2 \theta \cos^2 \theta$
13. Find the unknown side and angles of the following triangle: $a = \sqrt{3}$ cm, $c = \sqrt{13}$ cm.

14. Solve the following triangle when $m\angle B = 90^\circ$, $m\angle C = 60^\circ$, $c = 3\sqrt{3}$ cm.
15. Solve the following triangle when $m\angle B = 90^\circ$, $m\angle C = 45^\circ$, $a = 8$ cm.
16. Solve the following triangle when $m\angle B = 90^\circ$, $m\angle A = 60^\circ$, $c = 4$ cm.
17. If a ladder is placed along a wall such that the foot of the ladder is 2 m away from the wall and the length of the ladder is 8 m, find the height of the wall.
18. The diagonal of a rectangular field ABCD is $(x + 9)$ m and the sides are $(x + 7)$ m and x m. Find the value of x .
19. Prove the following identity: $\sin \theta / (1 - \cos \theta) = (1 + \cos \theta) / \sin \theta$
20. Prove the following identity: $\sin \theta (\operatorname{cosec} \theta - \sin \theta) = 1 / \sec^2 \theta$

Subjective Part-III

Question No. 8

1. Show that the points $A(0, 2)$, $B(\sqrt{3}, 1)$, and $C(0, -2)$ are vertices of a right triangle.
2. Show that the points $A(3, 1)$, $B(-2, -3)$, and $C(2, 2)$ are vertices of an isosceles triangle.
3. Show that the points $A(5, 2)$, $B(-2, 3)$, $C(-3, -4)$, and $D(4, -5)$ are vertices of a parallelogram.
4. Find k so that the line joining $A(7, 3)$, $B(k, -6)$ and the line joining $C(-4, 5)$, $D(-6, 4)$ are perpendicular.
5. Convert the following equation into slope-intercept form, two-intercept form, and normal form: $4x + 7y - 2 = 0$
6. Write down an equation of the straight line passing through $(5, 1)$ and parallel to a line passing through the points $(0, 1)$ and $(7, 15)$.
7. A man who is 1.8 m tall casts a shadow of 0.76 m in length. If at the same time a telephone pole casts a 3 m shadow, find the height of the pole.
8. Find the unknown A_1 in the given figure: A_1 has slant height 15 cm; a similar figure with slant height 12 cm has $A_2 = 96 \text{ cm}^2$.
9. Given that the area of $\triangle ABC = 36 \text{ cm}^2$ and $mAB = 6$ cm, $mBD = 4$ cm, find the area of $\triangle ADE$.
10. Given that the area of $\triangle ABC = 36 \text{ cm}^2$ and $mAB = 6$ cm, $mBD = 4$ cm, find the area of trapezium BCED.
11. The mass of a sack of rice is 50 kg and its height is 4 m. Find the mass of a similar sack of rice with a height of 6 m.
12. The ratio of the areas of two similar labels on two similar jars of coffee is 144:169. Find the ratio of their capacities.
13. Plot the graph of the following function: $y = 4^x$

14. Plot the graph of the following function: $y = 5^{-x}$
15. Plot the graph of the following function: $y = x^{1/2}$
16. Plot the graph of the following function: $y = 3x^{1/3}$
17. Plot the graph of the following function: $y = 2x^{-2}$

Question No. 9

1. Given the measurements of $\triangle DEF$: $m\angle D = 4.8^\circ$, $m\angle E = 4^\circ$, and $m\angle F = 45^\circ$. Draw the altitudes of $\triangle DEF$ and find the orthocentre.
2. Draw the angle bisector of a triangle FGH if: $m\angle F = 5.2^\circ$, $m\angle G = 4.1^\circ$, and $m\angle H = 120^\circ$.
3. The marks obtained by students in English are given. Find the Median of their marks:

Marks	Frequency
15–19	9
20–24	18
25–29	35
30–34	17
35–39	5

4. Given below is a frequency distribution. Find the Mode of the distribution:

Class Interval	Frequency
5–9	1
10–14	8
15–19	18
20–24	11
25–29	2

5. Ten boys work on a petrol pump. They get weekly wages as follows: 4250, 4350, 4400, 4250, 4350, 4410, 4500, 4300, 4500, 4390. Find the Arithmetic Mean by short formula, the Median, and the Mode of their wages.
6. The monthly attendance of 10 students for lunch is: 21, 15, 16, 18, 14, 17, 15, 12, 13, 11. Find the Median and Mode. Also find the Mean if $D = A - 20$.
7. The following are heights (in inches) of 40 students in Grade 8. Find the Mode:

Heights	Frequency
---------	-----------

48–50	10
50–52	9
52–54	5
54–56	7
56–58	6
58–60	3
Total students	40

8. The adjoining distribution shows the maximum load (in kg) supported by certain ropes. Find the Mean load using the short method:

Load (kg)	Frequency
93–97	5
98–102	12
103–107	6
108–112	2
113–117	2
118–122	8

9. The frequency of defective products in 750 samples is shown below. Find the Relative Frequency for the given table:

Defectives	Frequency
0	12
1	14
2	8
3	9
4	10
5	6
6	4
7	5
8	5

Visit Ahsa.Pk for more.
Join Al Huda Science Academy to
learn subjects easily.