



MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

STATISTICS

Others

1. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$, show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$

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2. Prove that $(\cos \theta - \sin \theta)(\sec \theta - \cos \theta) = \frac{1}{\tan \theta + \cot \theta}$.

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3. In Figure, $AB \perp BC$, $FG \perp BC$ and $DE \perp A$. Prove that triangle $ADE \sim GCF$

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4. Prove that $\frac{2\sqrt{3}}{5}$ is irrational.

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5. Show that any positive odd integer is of the form $4q + 1$ or $4q + 3$, where q is some integer.

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6. If α, β are zeroes of the polynomial $x^2 - 2x - 15$, then form a quadratic polynomial whose zeroes are (2α) and (2β) .

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7. A person can row a boat at the rate of 5 km/hour in still water. He takes thrice as much time in going 40 km upstream as in going 40 km downstream. Find the speed of the stream.

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8. In Figure, $AD \perp BC$ and $BD = \frac{1}{3}CD$. Prove that $2CA^2 = 2AB^2 + BC^2$

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9. Find the mode of the following distribution of marks obtained by 80 students:

Marks obtained	0-10	10-20	20-30	30-40	40-50
No. of students	6	10	12	32	20

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10. In Fig. 5.48, $AD = 4\text{cm}$, $BD = 3\text{cm}$ and $CB = 12\text{cm}$, find $\cot \theta$. $\frac{12}{5}$

(b) $\frac{5}{12}$ (c) $\frac{13}{12}$ (d) $\frac{12}{13}$ (FIGURE)

A. $12/5$

B. $5/12$

C. $13/12$

D. $12/13$

Answer: $12/5$



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11. The decimal expansion of $\frac{147}{120}$ will terminate after how many places of decimal? 1 (b) 2 (c) 3 (d) will not terminate



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12. The pair of linear equations $3x + 2y = 5$; $2x - 3y = 7$ have (a) One solution (b) Two solutions (c) Many solutions (d) No solution

A. one solution

B. two solution

C. many solution

D. no solution

Answer: one solution



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13. For a given data with 70 observations the less than ogive and the more than ogive intersect at $(20.5, 35)$. The median of the data is 20 (b) 35 (c) 70 (d) 20.5

A. 20

B. 35

C. 70

D. 20.5

Answer: 20.5



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14. Can $(x - 2)$ be the remainder on division of a polynomial $p(x)$ by $(2x + 3)$? Justify your answer.



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15. In Figure, $ABCD$ is a rectangle. Find the values of x and y .



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16. If $7 \sin^2 \theta + 3 \cos^2 \theta = 4$, show that $\tan \theta = \frac{1}{\sqrt{3}}$



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17. In Figure, If $DE \parallel BC$, then x equals. 6cm (b) 8cm (c) 10cm (d) 12.5



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18. In Figure, the graph of a polynomial $p(x)$ is shown. The number of zeroes of $p(x)$ is 4 (b) 1 (c) 2 (d) 3



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19. If 35 is removed from the data: 30,34,35,36,37,38,39,40, then the median increases by 2 (b) 1.5 (c) 1 (d) 0.5



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20. If $u_i = \frac{x_i - 25}{10}$, $\sum f_i u_i = 20$, $\sum f_i = 100$, then $\bar{x} =$ 23 (b) 24 (c) 27 (d) 25

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21. The mean of 1, 3, 4, 5, 7, 4 is m . The number 3, 2, 2, 4, 3, 3, p have mean $m - 1$ and median q . Then, $p + q =$ 4 (b) 5 (c) 6 (d) 7

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22. The mean of n observations is \bar{X} . If the first item is increased by 1, second by 2 and so on, then the new mean is (a) $\bar{X} + n$ (b) $\bar{X} + \frac{n}{2}$ (c) $\bar{X} + \frac{n+1}{2}$ (d) None of these

A. $\bar{X} + n$

B. $\bar{X} + \frac{n}{2}$

C. $\bar{X} + \frac{n+1}{2}$

D. None of these

Answer:

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23. The arithmetic mean of 1, 2, 3, ... n is (a) $\frac{n+1}{2}$ (b) $\frac{n-1}{2}$ (c) $\frac{n}{2}$ (d) $\frac{n}{2} + 1$

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24. During the medical check-up of 35 students of a class, their weights were recorded as follows: Draw a less than type ogive for the given data. Hence obtain the median weight from the graph and verify the result by using the formula.

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25. Given that $\tan \theta = \frac{1}{\sqrt{3}}$, the value of $\frac{\cos^2 \theta - \sec^2 \theta}{\cos^2 \theta + \sec^2 \theta}$ is -1 (b) 1 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

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26. For the following grouped frequency distribution find the mode:

Class: 3-6 , 6-9 , 9-12 , 12-15 , 15-18 , 18-21 , 21-24 Frequency: 2 , 5 , 10 , 23 , 12 , 3

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27. Draw a cumulative frequency curve and cumulative frequency polygon

for the following frequency distribution by less than method.

Age (in years):	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69
No. of Persons:	5	15	20	23	17	11	9

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28. If the mean of the following distribution is 54, find the value of p :

Class: 0-20 20-40 40-60 60-80 80-100 Frequency: 7 p 10 9 13

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29. If $2 \cos \theta - \sin \theta = x$ and $\cos \theta - 3 \sin \theta = y$. Prove that $2x^2 + y^2 - 2xy = 5$.

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30. Find the mean marks of the students from the following cumulative frequency distribution:

Marks:	Below	Below	Below	Below	Below	Below	Below	Below	Below
Below	Below	10	20	30	40	50	60	70	80
90	100	No. of Students	5	9	17	29	45	60	
70	78	83	85						

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31. Find the mean marks of students from the following cumulative frequency distribution:

marks	No. of Students	Marks	No. of
Students 0 and above	80	10 and above	72
above 10 and above	77	20 and above	65
above 20 and above	72	30 and above	55
above 30 and above	65	40 and above	43
above 40 and above	55	50 and above	30
above 50 and above	43	60 and above	20
above 60 and above	30	70 and above	10
above 70 and above	20	80 and above	8
above 80 and above	10	90 and above	0
above 90 and above	8	100 and above	0
above 100 and above	0		

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32. The number of students absent in a school was recorded every day for 147 days and the raw data was presented in the form of the following frequency table.

No. of students absent:	5	6	7	8	9	10	11	12	13	15	18	20
No. of days:	1	5	11	14	16	13	10	70	4	1	1	1

Obtain the median and describe what information it conveys.

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33. Classes:

25-29	30-34	35-39	40-44	45-49	50-
54	55-59	Frequency: 14	22	16	6
5	3	4			



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34. Compute the median form the following data: Mid-value: 115

125	135	145	155	165	175	185	195
Frequency:	6	25	48	72	116	60	38
22	3						



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35. Find the median of the following frequency distribution: Weekly

wages (in Rs.)	60-69	70-79	80-89	90-99	100-
109 110-119	No. of days:	5	15	20	30
20	8				



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36. Calculate the median from the following data: Marks: 0-

10	10-30	30-60	60-80	80-90	No. of
Students	5	15	30	8	2

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37. Find the mode of the following data:

25,16,19,48,19,20,34,15,19,20,21,24,19,16,22,16,18,20,16,19

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38. Compute the median for the following cumulative frequency distribution:

Class interval	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60	Less than 70	Less than 80	Less than 90	Less than 100
Cumulative Frequency	0	4	16	30	46	66	82	92	100

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39. In Figure, ABC is right angled at C , $BC = 7\text{cm}$ and $AC - AB = 1\text{cm}$. Find the value of $\cos A - \sin A$.

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40. In Figure, P and Q are the midpoints of the sides CA and CB respectively of ABC right angled at C . Prove that $4(AQ^2 + BP^2) = 5AB^2$.

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41. Diagonals of a trapezium $ABCD$ with $AB \parallel DC$ intersect each other at the point O . If $AB = 2CD$, find the ratio of the areas of triangles AOB and COD .

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42. The mean of the following frequency distribution is 50. Find the value of p .

Classes	0-20	20-40	40-60	60-80	80-100
Frequency	17	28	32	p	19



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43. If $\sec 4A = \operatorname{cosec}(A - 20^\circ)$, where $4A$ is an acute angle, find the value of A .



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44. In Figure $PQCD$ and $PRCB$. Prove that $\frac{AQ}{QD} = \frac{AR}{RB}$.



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45. In Figure, two triangles ABC and DBC are on the same base BC in which $\angle A = \angle D = 90^\circ$. If CA and BD meet each other at E , show that $AE \times CE = BE \times DE$.



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46. Find the mode of the following data:

Class :0-20, 20-40 ,40-60 ,60-80

Frequency:15, 6,18,10



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47. Theorem 6.9 : In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.



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48. If a line is drawn to one side of a triangle to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.



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49. Prove that : $\frac{\tan \theta}{1 - \cot \theta} + \frac{\cot \theta}{1 - \tan \theta} = 1 + \sec \theta \operatorname{cosec} \theta$

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50. Without using trigonometric tables, evaluate the following:

$$\frac{\sec 37^\circ}{\operatorname{cosec} 53^\circ} + 2 \cot 15^\circ \cot 25^\circ \cot 45^\circ \cot 75^\circ \cot 65^\circ (\sin^2 18^\circ + \sin^2 72^\circ)$$

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51. Find the mode of the following distribution of marks obtained by 80

students:	Marks obtained	0-10	10-20	20-30	30-40	40-50
	No. of students	6	10	12	32	20

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52. Divide $30x^4 + 11x^3 - 82x^2 - 12x + 48$ by $(3x^2 + 2x - 4)$ and verify the result by division algorithm.



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53. The following table shows the ages of 100 persons of a locality.

Age (in years)	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70
Number of persons	5	15	20	23	17	11	9

Represent the above as the less than type frequency distribution and draw an ogive for the same.



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54. The following table gives weekly wages in rupees of workers in a certain commercial organization. The frequency of class 49-52 is missing. It is known that the mean of the frequency distribution is 47.2. Find the

missing frequency.

Weekly wages (Rs.)	40-43	43-46	46-49	49-52	52-55
Number of workers:	31	58	60	?	27

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55. The mean of the following frequency table 50. But the frequencies f_1 and f_2 in class 20 – 40 and 60 – 80 are missing. Find the missing frequencies. Class: 0-20 20-40 40-60 60-80 80-100 Total Frequency: 17 f_1 32 f_2 19 120

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56. Find the mean of the following frequency distribution:

Classes:	0-20	20-40	40-60	60-80	80-100
Frequency:	21	29	17	15	18

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57. The following table gives the distribution of total household expenditure (in rupees) of manual workers in a city. Expenditure: (in Rs.)

100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500
24	40	33	28	30	22	16	7

Find the average expenditure (in Rs.) per household.



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58. A frequency distribution of the life times of 400 T.V. picture tubes tested in a tube company is given below. Find the average life of tube. Life Time (in hrs)

Life time (in hrs)	Frequency
300-399	14
400-499	46
500-599	58
600-699	76
700-799	68
800-899	80
900-999	90
1000-1099	100
1100-1199	62
1200-1299	48
1300-1399	22
1400-1499	6



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59. If the mean of the following distributions is 54, find the value of p :

Class: 0-20 20-40 40-60 60-80 80-100 Frequency: 7 p 10 9 13

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60. Apply step-deviation method to find the AM of the following

frequency distribution Variate(x) 5 10 15 20 25 30 35 40 45 50 Frequency(f)

20 43 75 67 72 45 39 9 8 6

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61. The weights in kilograms of 60 workers in a factory are given in the

following frequency table. Find the mean weight of a worker. Weight (in

kg) x : 60 61 62 63 64 65 No. of workers f : 5 8 14 16 10 7

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62. The table below gives the distribution of villages under different heights from sea level in a certain region. Compute the mean height of the region:

Height (in metres)	200	600	1000	1400	
No. of village:	1800	2200	142	265	560
	271	89	16		



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63. Find the mean of the following frequency distribution: Class-interval:

Class-interval	0-10	10-20	20-30	30-40	40-50	No. of workers
f:		7	10	15	8	
	10					



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64. In an isosceles triangle ABC with $AB = AC$ and $BD \perp AC$. Prove that $BD^2 - CD^2 = 2CD \cdot AD$.



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65. If the pair of linear equations $(3k + 1)x + 3y - 2 = 0$ and $(k^2 + 1)x + (k - 2)y - 5 = 0$ inconsistent, The value of k is



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66. The following table gives the production yield per hectare of wheat of 100 farms of a village.

Production yield (in kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
No. of farms	2	8	12	24	38	16

Change the above distribution to more than type distribution and draw its ogive.



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67.

Evaluate:

$$\frac{\sec \theta \operatorname{cosec}(90^\circ - \theta) - \tan \theta \cot(90^\circ - \theta) + \sin^2 55^\circ + \sin^2 35^\circ}{\tan 10^\circ \tan 20^\circ \tan 60^\circ \tan 70^\circ \tan 80^\circ}$$

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68. If $\sec \theta + \tan \theta = p$, prove that $\sin \theta = \frac{p^2 - 1}{p^2 + 1}$

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69. Theorem 6.9 : In a triangle, if square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle.

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70. Prove that : $\frac{\sec \theta + \tan \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{\cos \theta}{1 - \sin \theta}$

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71. Find all zeros of the polynomial $2x^4 + 7x^3 - 19x^2 - 14x + 30$, if two of its zeros are $\sqrt{2}$ and $-\sqrt{2}$.

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72. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians.

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73. What is the value of the median of the data using the graph in the following figure of less than ogive and more than ogive? (FIGURE)

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74. ABC and PQR are similar triangles such that $\angle A = 32^\circ$ and $\angle R = 65^\circ$. Then, $\angle Q$ is 83° (b) 32° (c) 65° (d) 97°



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75. The value of p for which the polynomial $x^3 + 4x^2 - px + 8$ is exactly divisible by $(x - 2)$ is 0 (b) 3 (c) 5 (d) 16



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76. The value of $[(\sec A + \tan A)(1 - \sin A)]$ is equal to $\tan^2 A$ (b) $\sin^2 A$
(c) $\cos A$ (d) $\sin A$



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77. If $\sin A + \sin^2 A = 1$, then the value of $\cos^2 A + \cos^4 A$ is 2 (b) 1 (c) -2 (d) 0



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78. The value of k for which the pair of linear equation $4x + 6y - 1 = 0$ and $2x + ky - 7 = 0$ represent parallel lines is $k = 3$
(b) $k = 2$ (c) $k = 4$ (d) $k = -2$

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79. The $[HCF \cdot LCM]$ for the numbers 50 and 20 is 10 (b) 100 (c) 1000
(d) 50

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80. In Figure, $ABCD$ is a parallelogram. Compute the values of x and y

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81. Find the quadratic polynomial with zeroes $3 + \sqrt{2}$ and $3 - \sqrt{2}$

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82. Find the mean wage from the data given below: Wage (in Rs)

800	820	860	900	920	980	1000	No. of
workers:	7	14	19	25	20	10	5



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83. Find the mean of the following distribution: x: 10

30	50	70	89	f:	7	8
10	15	10				



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84. Find the mean of the following distribution: x: 4

6	9	10	15	f:	5	10
10	7	8				



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85. Following table shows the weights of 12 students: Weight (in kgs): 67 70 72 73 75 No. of Students: 4 3 2 2 1 Find the mean weight.

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86. Find the missing frequencies in the following frequency distribution if it is known that the mean of the distribution is 1.46.

N	0	1	2	3	4
Frequency (f):	46	?	?	25	10

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87. Find the value of p , the mean of the following distribution is 7.5

x	3	5	7	9	11	13
f	6	8	15	p	8	4

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