



MATHS

BOOKS - UNITED BOOK HOUSE

JADAVPUR VIDYAPITH

Exercise

1. $A=\{a,b,c\}$ and $B=\{1,2,3,4\}$.Find the total number of relation from A to B.



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2. If $A \subseteq B$ show that $A - B = \phi$



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3. $A = \{0,1\}$ find $A \times A \times A$



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4. $2f(x) + 3f(-x) = 15 - 4x$ then $[f(1) + f(-1)] = ?$



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5. $f(x)=a+b \sin x$, has max value of 7 and min value

1. Find $f(\pi / 6)=?$



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6. $\tan 25^\circ = a$ prove that

$$\frac{\tan 155^\circ - \tan 115^\circ}{1 + \tan 155^\circ \cdot \tan 115^\circ} = \frac{1 - a^2}{2a}$$



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7. Prove that $\tan 70^\circ = 2\tan 50^\circ + \tan 20^\circ$.



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8. $a = \frac{1+i}{\sqrt{2}}$ then $a^6 + a^4 + a^2 + 1 = ?$



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9. $x(x-3)=4$, has two roots α and β then $\alpha^2 + \beta^2 = ?$



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10. Find the area of the triangle formed by the straight line $x \cos \alpha + y \sin \alpha = P$ and two coordinate axes.



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11. Straight line $px - qy = r$ intercept the coordinate axis at the point $(a, 0)$ and $(0, b)$. Find $(a+b)$.



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12. A relation R defined on the set of natural no as follows $R = \{(x, y), x + 5y = 20, x, y \in \mathbb{N}\}$. Find in domain and range of R .



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13.

$$\cos(\beta - \gamma) + \cos(\gamma - \alpha) + \cos(\alpha - \beta) = -\frac{3}{2}$$

show that $\cos \alpha + \cos \beta + \cos \gamma = 0$ and

$\sin \alpha + \sin \beta + \sin \gamma = 0$ also

$$\cos(\beta - \gamma) = \cos(\gamma - \alpha) = \cos(\alpha - \beta) = -\frac{1}{2}$$

.



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14. $\sin \theta + \sin \phi = a$, $\cos \theta + \cos \phi = b$ show

$$\text{that } \tan\left(\frac{\theta - \phi}{2}\right) = \pm \sqrt{\frac{4 - a^2 - b^2}{a^2 + b^2}}$$



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15. If $\cos \theta = \frac{a \cos \phi + b}{a + b \cos \phi}$ (θ, ϕ acute \angle) show that $\tan\left(\frac{\theta}{2}\right) = \sqrt{\frac{a-b}{a+b}} \tan\left(\frac{\phi}{2}\right)$ ($a > b$)



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16. In a triangle ABC if $a \cos^2\left(\frac{C}{2}\right) + c \cos^2\left(\frac{A}{2}\right) = \left(\frac{3b}{2}\right)$ show that sides of the triangle are in A.P.



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17. If w be a imaginary cube root of unity and

$a+b+c=0$ then show that

$$(a + bw + cw^2)^3 + (a + bw^2 + cw)^3 = 27abc$$



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18. An equilateral triangle in the Argand plane

has vertices as z_1, z_2 and z_3 which are three

complex numbers. Show that

$$\frac{1}{z_1 - z_2} + \frac{1}{z_3 - z_1} + \frac{1}{z_2 - z_3} = 0$$



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19. If the equation $x^2 + px + qr = 0$ and $x^2 + qx + pr = 0$ ($p \neq q, r \neq 0$) has same root then prove that $p+q+r=0$



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20. Prove that ${}^n P_r = (n-1)P_r + r^{n-1}P_{r-1}$ (notation used are in their usual meaning).



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21. How many way will be made from the word JADAVPUR taking al the letters at a time where two A's never come together.



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22. If a, b, c are in G.P and x, y are the arithmetic mean of a and b aand b, c prove that $a/x+c/y=2$ and $1/x+1/y=2/b$.



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23. Sum of the reciprocal intercepts on the axes by a moving straight line in its all position remain constant .Show that straight line always passes througah a fixed point .



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24. Distance of the straight line $4x+3y=5 \cos \alpha$ and $6x-8y=5 \sin \alpha$ from the origin are p_1 and p_2 respectively show that $p_1^2 + 4p_2^2 = 1$



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25. Wages (in Rs) obtained by workers is a

- A. a) Discrete variable
- B. b) Continuous variable
- C. c) Attribute
- D. c) none of these

Answer:



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26. Division obtained in an examination is

A. a) Nominal attribute

B. b) Ordinal attribute

C. c) Discrete variable

D. d) none of these

Answer:



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27. Class width of a class interval is defined as

A. a) upper class boundary-lower class

boundary of the class

B. b) upper class limit-lower class limit of

the class

C. c) none of these

D.

Answer:



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28. A line diagram is used to represent.

- A. a) Time-series
- B. b) spatial-series data
- C. c) frequency data
- D. d) none of these

Answer:



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29. Harmonic mean of 1, $\frac{1}{2}$ and $\frac{1}{3}$

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. 1

D. none of these

Answer:



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30. Standard deviation of 1, 2, 3, 4, 5 is 2. Then standard deviation of (-2), (-4), (-6), (-8), (-10) is

A. a) (-)2

B. b) 2

C. c) (-)4

D. d) 4

Answer:



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31. if $3y + 4x = 8$ and $QD(y) = 12$, then value of $QD(x)$ is

A. 7

B. 9

C. (-)7

D. (-)9

Answer:



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32. Define primary data with an example.



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33. Define class boundary.



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34. Name the various parts of a table.



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35. What are represented along the horizontal axis and vertical axis in drawing an ogive?



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36. A variable assumes the values x_1, x_2, \dots, x_n

with frequencies f_1, f_2, \dots, f_n In

respectively, show that
$$\sum_{i=1}^n f_i(x_i - \bar{x}) = 0.$$



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37. Mean and median of a frequency distribution are 24 and 26.5 respectively. Find the mode using empirical formula.



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38. In a frequency distribution having 6 class intervals the total frequency is 100 and cumulative frequency less than type and cumulative frequency more than type corresponding to the fourth class interval are

86 and 50 respectively. Find the frequency of the fourth class interval.



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39. If arithmetic mean and coefficient of variation of a variable x are 10 and 50% respectively, find $\text{Var}(5 - 2x)$.



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40. Discuss Questionnaire Method and Interviewer Method.



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41. Discuss the method of drawing a Histogram with an example.



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42. If G_1 , G_2 and G denotes GM of the first group, GM of the second group and GM of the composite group respectively and if $G_1 < G_2$, show that $G_1 < G < G_2$.



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43. If SD of first n odd positive integers is $\sqrt{133}$, find n .



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44. Give an example of intensive variable.



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45. Find the mean deviation about mean of two values x_1 and x_2 .



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46. Express standard deviation of the composite group in terms of number of

observations, arithmetic means and variances of two groups.



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