



MATHS

BOOKS - UNITED BOOK HOUSE

TANTIA HIGH SCHOOL

Exercise

1. If $A = \{1, 3, 5, 7\}$ and $P(A)$ be the power of set A , then find which one of the following is true ___

A. a) $\{1, 3\} \subseteq P(A)$

B. b) $\{1, 3\} \subset A(A)$

C. c) $\{1, 3\} \in P(A)$

D. d) None of these

Answer:



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2. Which one is true ? ___

A. a) $2 + 3i > 1 + 4i$

B. b) $3 + 3i > 6 + 2i$

C. c) $5 + 9i > 5 + 6i$

D. d) None of these

Answer:



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3. The sum of the first 26 odd numbers is __

A. a) $(26)^4$

B. b) $(26)^3$

C. c) $(26)^2$

D. d) $(26)^5$

Answer:



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4. If the m^{th} term and the n^{th} term of an A.P. are respectively $\frac{1}{n}$ and $\frac{1}{m}$, then the $(mn)^{th}$ term of the A.P. is

A. a) $\frac{1}{mn}$

B. b) m/n

C. c) 1

D. d)n/m

Answer:



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5. The equation of a line which makes concentric to the circle $x^2 + y^2 - 4x + 2y - 20 = 0$ and passes through the origin is __

A. a) $y=x+3$

B. b) $y=3$

C. c) $x=3$

D. d)None of these

Answer:



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6. The length of diameter of the circle concentric to the circle $x^2 + y^2 - 4x + 2y - 20 = 0$ and passes through the origin is ___

A. a)10 unit

B. b) $\sqrt{20}$ unit

C. c) $\sqrt{5}$ unit

D. d)None of these

Answer:



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7. The value of $\lim_{x \rightarrow 0} (1 - \cos(x/3))/x^2$

A. a)13

B. b)9

C. c)1/9

D. d)1/18

Answer:



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8. If $f(x)=3x+2$, then the value of $f'(-3)$ is

A. a) 0

B. b) 3

C. c) -3

D. d) Does not exist

Answer:



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9. If $\frac{1}{8!} + \frac{1}{9!} = \frac{x}{(10)!}$ then the value of x is ___

A. a)100

B. b)10

C. c)81

D. d)64

Answer:

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10. The value of $(\tan 9^\circ - \tan 27^\circ - \tan 63^\circ + \tan 81^\circ)$ is ___

A. a)2

B. b)4

C. c)1

D. d)-1

Answer:



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11. Write down the power set of $[\phi]$



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12. A relation R defined on N (the set of all natural numbers) is defined as follows:

$R = \{(x, y) \in N \times N, 2x + y = 24\}$. Find the domain of R .



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13. Prove that $\cot 70^\circ + 4\cos 70^\circ = \sqrt{3}$



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14. Find the value of $\left(\frac{1}{2\sin 10^\circ} - 2\sin 70^\circ \right)$



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15. Express $(\sqrt{3} - i)$ in the modulus amplitude form.



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16. If S_n be the sum of the n consecutive terms of an A.P, find the value of

$$S_{n+3} - 3S_{n+2} + 3S_{n+1} - S_n$$



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17. If ${}^9P_5 + 5 \cdot {}^9P_4 = {}^9P_r$, find r .



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18. If α and β be two roots of the equation $(x-a)(x-b)=c$ then show that a and b are the roots of

$$(x - \alpha)(x - \beta) + c = 0$$



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19. Find the point on the straight line $3x - 4y = 25$, nearest to the origin .



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20. Find the centre and the radius of the circle.

$$2x^2 + 2y^2 - 4x + 8y - 4 = 0$$



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21. If θ be a variable parameter find the curve whose parametric equations are

$$x = \frac{1}{4} (3 - \cos e c^2 \theta) \text{ \& } y = 2 + \cot \theta$$



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22. Find the area of greatest square that can be inscribed given straight lines : $2x+5y+8=0$ & $2x+5y-12=0$



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23. Evaluate : $\lim_{x \rightarrow 1} \frac{x + x^2 + x^3 + \dots + x^n - n}{x - 1}$



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24. If $y=(1-x)(2-x)(3-x)\dots(n-x)$, find dy/dx



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25. show that $\lim_{n \rightarrow 0} \frac{\sqrt[3]{n+1} - 1}{n} = \frac{1}{3}$



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26. For any two sets A,B ,prove that

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



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27. If $\frac{\cot(\alpha - \beta)}{\cot \alpha} + \frac{\cos^2 \gamma}{\cos^2 \alpha} = 1$ show that
 $\tan^2 \gamma + \tan \alpha \cot \beta = 0$



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28. If $\sin x - \sin y = a$ and $\cos x + \cos y = b$, prove that

$$\tan\left(\frac{x+y}{2}\right) = \pm \sqrt{\frac{4 - a^2 - b^2}{a^2 + b^2}}$$



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29.

Prove

that

$$\frac{\sin \theta}{\cos 3\theta} + \frac{\sin 3\theta}{\cos 9\theta} + \frac{\sin 9\theta}{\cos 27\theta} = \frac{1}{2} (\tan 27\theta - \tan \theta)$$



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30.

If

$$\tan\left(\frac{\theta}{2}\right) = \tan^3\left(\frac{\phi}{2}\right) \text{ and}$$

$\tan \phi = 2 \tan \alpha$, then prove that $\theta + \phi = 2\alpha$



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31. If a, b are real and $a^2 + b^2 = 1$, then prove that the equation $\frac{1 - ix}{1 + ix} = a - ib$ is satisfied for all real values of x .



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32. If the roots of the equation $x^2 + 2px + q = 0$ and $x^2 + 2qx + p = 0$ where $p \neq q$. Differ by a constant, prove that $p+q+1=0$



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33. Prove that the product of any r consecutive natural number is always divisible by $r!$.



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34. Find the rank of the word LAKE, when the letters are arranged as in a dictionary.



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35. The sum of three numbers in G.P is 70. If the two extremes be multiplied each by 4 & the

mean by 5, the products are in A.P. Find the numbers.



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36. A ray of light coming from $(1, 2)$ to the x axis at A and reflecting with the point $(5, 3)$. Find the co-ordinate of A .



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37. The equation of a side of a rectangle is $4x+7y+5=0$ and the two vertices are $(-3,1)$ & $(1,1)$. Find the equation of other three sides.



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38. Find the equation of the circle described on the common chord of the circles $x^2 + y^2 - 4x - 5 = 0$ and $x^2 + y^2 + 8x + 7 = 0$ as diameter.



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39. Find the equation of the parabola whose focus is at the origin and the equation of the directrix is $x+y=1$



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40. Evaluate : $\lim_{x \rightarrow 0} \frac{\sqrt{\cos x} - \sqrt[3]{\cos x}}{\sin^2 x}$



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41. Find from first principle, the derivative of

$$\sqrt{\tan x}$$



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42. If $y = \sqrt{\frac{x}{m}} + \sqrt{\frac{m}{x}}$, Prove that

$$2xy \frac{dy}{dx} = x/m - m/x$$



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43.

Show

that,

$$\tan 7\left(\frac{1^\circ}{2}\right) = \sqrt{6} - \sqrt{3} + \sqrt{2} - 2$$



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44.

Solve

θ

for

$$4 \sin \theta \cos \theta = 1 + 2 \cos \theta - 2 \sin \theta \quad (0$$



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45. Exhibit graphically the solution sets of the following system of linear inequations.

$$x - 2y \leq 3, 3x + 4y \geq 12, x \geq 0, y \geq 0$$



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46. state the fundamental theorem of algebra and solve the equation $3x^2 - 5ix + 3 = 0$

$$(i = \sqrt{-1})$$



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47. Find the number of selection that can be done from the letters of the word STATISTICS,taking 4 at a time.



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48. Find the sum of the series upto a n terms
 $2 + 3.3 + 4.3^2 + 5.3^3 + \dots +$ to n terms.



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49. Show that the straight line $(a + 2b)x + (a - 3b)y + b - a = 0$ always passes through a fixed point. Find the co-ordinate of that point.



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50. Show that for all values p , the circle $x^2 + y^2 - x(3p + 4) - y(p - 2) + 10p = 0$ passes through the point $(3,1)$. If p varies, find the locus of the centre of the above circle.



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51. \overline{PQ} is a double ordinate of the parabola $y^2 = 4ax$, find the equation to the locus of its point of trisection.



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