doubtnut
India's Number 1 Education App

MATHS

BOOKS - MODERN PUBLICATION MATHS (KANNADA ENGLISH)

UNIT TEST PAPER NO.3

Select The Correct Answer

1. If $u = \sqrt{a^2\cos^2\theta + b^2\sin^2\theta} + \sqrt{a^2\sin^2\theta + b^2\cos^2\theta}$, then the difference between the maximum and minimum values of u^2 is given by :

A. $2\left(a^2 + b^2\right)$

B. $2\sqrt{a^2 + b^2}$

C. $(a + b)^2$

D. $(a - b)^2$

Answer: D

Watch Video Solution

2. Let α, β be such that $\pi < \alpha - \beta < 3\pi$.

If $\sin\alpha + \sin\beta = -\frac{21}{65}$ and $\cos\alpha + \cos\beta = -\frac{17}{65}$, then the value of $\cos.\frac{\alpha-\beta}{2}$ is :

A. $-\frac{3}{\sqrt{130}}$

B. $\frac{3}{\sqrt{130}}$

C. $\frac{6}{65}$

D. $-\frac{6}{65}$

Answer: A

Watch Video Solution

3. The number of integral values of k for which the equation $7\cos x + 5\sin x = 2k + 1$ has a solution is :

A. 4

B. 8

C. 10

D. 12

Answer: B

Watch Video Solution

4. In a triangle ABC, $2ac\sin.\ \frac{1}{2}(A - B + C)$ is equal to :

A. $a^2 + b^2 - c^2$

B. $c^2 + a^2 - b^2$

C. $b^2 - c^2 - a^2$

D. $c^2 - a^2 - b^2$

Answer: B

Watch Video Solution

5. $\cot^{-1}\left(\sqrt{\cos\alpha}\right) - \tan^{-1}\left(\sqrt{\cos\alpha}\right) = x$, then sin x =

A. $\tan^2.\ \frac{\alpha}{2}$

B. $\cot^2.\ \frac{\alpha}{2}$

C. $\tan\alpha$

D. $\cot.\ \frac{\alpha}{2}$

Answer: A

Watch Video Solution

6. For a positive integer n, let :

$f_n(\theta) = \left(\tan.\ \frac{\theta}{2}\right)(1+\sec\theta)(1+\sec 2\theta)$

$(1+\sec 4\theta)\ldots.\ (1+\sec 2^n\theta)$. Then :

A. $f_2\left(\frac{\pi}{4}\right) = -1$

B. $f_3\left(\frac{\pi}{32}\right) = -1$

C. $f_4\left(\frac{\pi}{256}\right) = 1$

D. $f_5\left(\frac{\pi}{128}\right) = -1$

Answer: B

Watch Video Solution

7. For $0 < \phi \leq \pi/2$, if :

$x = \sum_{n=0}^{\infty} \cos^{2n}\phi, y = \sum_{n=0}^{\infty} \sin^{2n}\phi,$

$z = \sum_{n=0}^{\infty} \cos^{2n}\sin^{2n}\phi$, then :

A. $xyz = xz + y$

B. $xyz = xy + z$

C. $xyz = x + yz$

D. $xyz = yz + x$

Answer: B

Watch Video Solution

8. If $\sin(\alpha+\beta)=1, \sin(\alpha-\beta)=\frac{1}{2}$ then $\tan(\alpha+2\beta)\tan(2\alpha+\beta)$=

A. 1

B. -1

C. zero

D. none of these

Answer: A

Watch Video Solution

9. The number of values of x in the interval $[0, 5\pi]$ satisfying the equation $3\sin^2 x - 7\sin x + 2 = 0$ is

A. 0

B. 5

C. 6

D. 10

Answer: C

Watch Video Solution

10. If $\Delta = a^2 - (b-c)^2$, Δ is the area of the ΔABC then $\tan A =$?

A. $15/16$

B. $8/17$

C. $8/15$

D. $1/2$

Answer: C

Watch Video Solution

11. The median of a set of 9 distinct observations is 20.5 If each of the largest 4 observations of the set is increased by 2, then the median of the new set :

A. is decreased by 2

B. it twice the original median

C. remains the same as that of the original set

D. is increased by 2

Answer: C

Watch Video Solution

12. If $4n\alpha = \pi$, then the numerical value of :

$\tan\alpha \tan 2\alpha \tan 3\alpha \ldots . \tan(2n-1)\alpha =$

A. -1

B. 0

C. 1

D. 2

Answer: C

Watch Video Solution

13. If $a_{n+1} = \sqrt{\frac{1}{2}(1 + a_n)}$, then :

$\cos\left(\frac{\sqrt{1 - a_0^2}}{a_1 a_2 a_3 \ldots \text{to} \ \infty}\right)$ equals :

A. -1

B. 1

C. $\frac{1}{a_0}$

D. a_0

Answer: D

View Text Solution

14. If in a triangle ABC, $a\cos^2.\frac{C}{2}+c\cos^2.\frac{A}{2}=\frac{3b}{2}$, then the sides a, b, c :

A. are in G.P.

B. are in H.P.

C. satisfy $a+b=c$

D. are in A.P.

Answer: D

Watch Video Solution

15. The sides of a triangle are $\sin\alpha$, $\cos\alpha$ and $\sqrt{1+\sin\alpha\cos\alpha}$ for some $0<\alpha<\frac{\pi}{2}$. Then the greatest angle of the triangle is :

A. 60°

B. 90°

C. 120°

D. 150°

Answer: C

Watch Video Solution

16. Which of the following pieces of data does NOT uniquely determine an acute angled triangle ABC (R being the radius of the circumcircle) ?

A. $a, \sin A \sin B$

B. a, b, c

C. $a, \sin B, R$

D. $a, \sin A, R$

Answer: D

Watch Video Solution

17. The upper $\frac{3}{4}th$ portion of a vertical pole subtends an angle $\tan^{-1}\left(\frac{3}{5}\right)$ at a point in the horizontal plane through its foot and at a distance 40 m from the foot. A possible height of the vertical pole is :

A. 40 m

B. 60 m

C. 80 m

D. 20 m

Answer: A

Watch Video Solution

18. Consider the following statements :

(a) Mode can be computed from histogram

(b) Median is not independent of change of scale

(c) Variance is independent of change of origin and scale

Which of these is/are correct ?

A. only (a)

B. only (b)

C. only (a) and (b)

D. (a), (b) and (c)

Answer: B

Watch Video Solution

19. An automobile driver travels from plane to a hill station, a distance of 120 km at an average speed of 30 km per hour. He then makes the return trip at an average speed of 25 km per hour. He covers another 120 km distance on plane at an average speed of 50 km per hour. His average speed over the entire distance of 360 km will be :

A. $\frac{3}{\frac{1}{30}+\frac{1}{25}+\frac{1}{50}} km/hr$

B. $\frac{30+25+50}{3} km/hr$

C. $(30.25.50)^{1/3} km/hr$

D. none of these

Answer: A

Watch Video Solution

20. If $\alpha, \beta, \gamma \in \left(0, \frac{\pi}{2}\right)$, then $\frac{\sin(\alpha+\beta+\gamma)}{\sin\alpha+\sin\beta+\sin\gamma}$ is :

A. >1

B. <1

C. $=1$

D. none of these

Answer: B

Watch Video Solution

21. If $A + B + C = \frac{3\pi}{2}$, then $\cos 2A + \cos 2B + \cos 2C =$

A. $1 - 4\cos A \cos B \cos C$

B. $4\sin A \sin B \sin C$

C. $1 + 2\cos A \cos B \cos C$

D. $1 - 4\sin A \sin B \sin C$

Answer: D

Watch Video Solution

22. Minimum value of $4x^2 - 4x|\sin\theta| - \cos^2\theta$ is :

A. -2

B. -1

C. $-\frac{1}{2}$

D. 0

Answer: B

Watch Video Solution

23. In any triangle ABC, $\sum \frac{\sin^2 A + \sin A + 1}{\sin A}$ is always greater than :

A. 3

B. 9

C. 27

D. Does not exist

Answer: B

Watch Video Solution

24. $\sim(p \wedge q)=$

A. $\sim p \wedge q$

B. $\sim p \vee \sim q$

C. $\sim p \wedge \sim q$

D. none of these

Answer: C

Watch Video Solution

25. $(p \vee r) \wedge (q \vee r) =$

A. $p \vee (q \wedge r)$

B. $p \wedge (q \vee r)$

C. $(p \wedge q) \vee r$

D. none of these

Answer: C

View Text Solution

Assertion Reason Column Matching Type Questions Section A Assertion Reason Type Questions

1. Statement-1 : $\cos.\frac{\pi}{7}\cos.\frac{2\pi}{7}\cos.\frac{4\pi}{7} = -\frac{1}{8}$

Statement-2 : $\cos\theta\cos 2\theta\cos 2^2\theta\underset{\cos 2^{n-1}\theta}{.....} = -\frac{1}{2^n}$ if $\theta = \frac{\pi}{2^n - 1}$

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: A

View Text Solution

2. Statement-1 : $\sin 78^\circ + \sin 52^\circ + \sin 50^\circ = 4\cos 25^\circ \cos 26^\circ \cos 39^\circ$

Statement-2 : If $A + B + C = \pi$, then.

$\cos A + \cos B + \cos C = 4\cos.\ \frac{A}{2}\cos.\ \frac{B}{2}\cos.\ \frac{C}{2}.$

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-2

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-2

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: A

View Text Solution

3. Statement-1 : $\frac{\sin(A+B)+\sin(A-B)}{\cos(A+B)+\cos(A-B)} = \tan A$

Statement-2 : $\sin(A+B)+\sin(A-B) = \sin A$

and $\cos(A+B)+\cos(A-B)=\cos A$.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-3

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-3

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: C

Watch Video Solution

4. Statement-1 :

$\tan\theta+2\tan 2\theta+4\tan 4\theta+8\tan 8\theta-16\cot 16\theta=\cot\theta$

Statement-2 : $\cot\theta-\tan\theta=2\cot 2\theta$.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-4

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-4

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: A

View Text Solution

5. Statement-1 : $\tan A + \tan B + \tan C = \tan A \tan B \tan C$

implies A, B, C are angles of a triangle.

Statement-2 : In any triangle ABC, $A + B + C = 0$.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-5

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-5

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: D

View Text Solution

6. Statement-1 : If $\cos(\beta-\gamma)+\cos(\gamma-\alpha)+\cos(\alpha-\beta)=-\frac{3}{2}$, then :

$\sin\alpha+\sin\beta+\sin\gamma$

$=\cos\alpha+\cos\beta+\cos\gamma=0$

Statement-2 : $a^2+b^2=0\Rightarrow a=b=c.$

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-6

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-6

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: A

View Text Solution

7. Statement-1 : If tan A, tan B are the roots of the equation $x^2 - px - 1 = 0$, then :

$\sin^2(A+B) = \frac{p^2}{1+p^2}$

Statement-2 : $\sin^2(A+B) = \frac{\tan^2(A+B)}{1+\tan^2(A+B)}$

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-7

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-7

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: D

View Text Solution

8. Consider the equation $\sin x = k$, k being a parameter lying in the inverval $[-1, 1]$.

Statement-1 : For given k, the equation $\sin x = k$ has two solutions in $[0, 2\pi]$

Statement-2 : $\sin\theta = k \Leftrightarrow \sin(\pi - \theta) = k$.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-8

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-8

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: D

View Text Solution

9. Let p be the statement "x is an irrational number", q be the statement" y is a transcendental number" and r be the statement" x is a rational number iff y is a transcendental number."

Statement-1 : r is equivalent to either q or p

Statement-2 : r is equivalent to $\sim(p \Leftrightarrow \sim q)$.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-9

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-9

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: A

Watch Video Solution

10. Statement-1 : The variance of first n even natural numbers is $\frac{n^2-1}{4}$

Statement-2 : The sum of first n natural number is $\frac{n(n+1)}{2}$ and the sum of the squares of first n natural number is $\frac{n(n+1)(2n+1)}{6}$.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-10

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-10

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: D

View Text Solution

11. Statement-1 : $\sim(p \Leftrightarrow \sim q)$ is equivalent to $p \Leftrightarrow q$

Statement-2 : $\sim(p \Leftrightarrow \sim q)$ is tautology.

A. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

B. Statement-1 is true, statement-2 is true, statement-2 is not a correct explanation for statement-1

C. Statement-1 is true, statement-2 is false

D. Statement-1 is false, statement-2 is true

Answer: C

Watch Video Solution

12. Let $x_1, x_2, \ldots\ldots, x_n$ be n observations, and let $\bar{x}$ be their arithmetic mean and σ^2 be the variance.

Statement-1 : Variance of $2x_1, 2x_2, \ldots\ldots, 2x_n$ is $4\sigma^2$.

Statement-2 : Arithmetic mean of $2x_1, 2x_2, \ldots\ldots, 2x_n$ is $4\bar{x}$.

A. Statement-1 is true and statement-2 is true; statement-2 is not a correct explanation for statement-1

B. Statement-1 is true, statement-2 is false

C. Statement-1 is false, statement-2 is true

D. Statement-1 is true, statement-2 is true, statement-2 is a correct explanation for statement-1

Answer: C

Watch Video Solution

13. Consider :

Statement-1 : $(p \wedge \sim q) \wedge (\sim p \wedge q)$ is a fallacy.

Statement-2 : $(\pi mpliesq) \Leftrightarrow (\sim q \Rightarrow \sim p)$ is a tautology.

View Text Solution

Assertion Reason Column Matching Type Questions Section B Column Matching Type Questions

1.

List-I

(A) If mean of 27, 31, 89, 107, 156 is 82, then mean of 130, 126, 68, 50, 1 is

(B) S. D. of scores 1, 2, 3, 4, 5 is

(C) If mode is 18 and mean is 24, then median is

(D) Mean of first n natural number is

View Text Solution

2.

List-I

(A) If $\tan A = \frac{1}{2}\tan B = \frac{1}{3}$, then $\tan(2A + B)$ is

(B) Value of $\sin 50^\circ - \sin 70^\circ + \sin 10^\circ$ is equal to

(C) Number of solutions of $\tan x + \sec x = 2\cos x$ laying in $[0, 2\pi]$ is

(D) Greatest value of sin x cos x is

View Text Solution

3.

List-I

(A) In a $\Delta ABC a + b = 3c$, then $\cot. \frac{A}{2} \cot. \frac{B}{2}$ is

(B) If the sides a, b, c of a triangle are in A.P., then the value of $\cot. \frac{A}{2}$ c

(C) In a $\Delta ABC a(b\cos C - \cos B)$ is equal to

(D) In a $\Delta ABC a = 2b$ and $|A - B| = \frac{\pi}{3}$ Then $\angle C$ is

View Text Solution

4.

	List-I		List-II
(A)	$\sim(p \wedge q)$ equals	(i)	$\sim p \wedge \sim q$
(B)	$\sim(p \vee q)$ equals	(ii)	$p \wedge (\sim q)$
(C)	$\pi mpliesq =$	(iii)	$\sim p \vee \sim q$
(D)	$\sim(\pi mpliesq) =$	(iv)	$(\sim p) \vee q$

View Text Solution