

JEE MAINS 2020 PROBLEM SET : online

1 JEE Main 2020 (Online) 9th January Morning Slot

MCQ (Single Correct Answer)

The value of

$$\cos^3\left(\frac{\pi}{8}\right)\cos\left(\frac{3\pi}{8}\right) + \sin^3\left(\frac{\pi}{8}\right)\sin\left(\frac{3\pi}{8}\right)$$

is :

A $\frac{1}{\sqrt{2}}$

B $\frac{1}{2}$

C $\frac{1}{4}$

D $\frac{1}{2\sqrt{2}}$

Ans - D

4 JEE Main 2020 (Online) 9th January Evening Slot

MCQ (Single Correct Answer)

$$\text{If } x = \sum_{n=0}^{\infty} (-1)^n \tan^{2n} \theta \text{ and } y = \sum_{n=0}^{\infty} \cos^{2n} \theta$$

for $0 < \theta < \frac{\pi}{4}$, then :

A $x(1+y) = 1$

B $y(1-x) = 1$

C $y(1+x) = 1$

D $x(1-y) = 1$

Ans - B

3 JEE Main 2020 (Online) 2nd September Evening Slot

MCQ (Single Correct Answer)

If the equation $\cos^4 \theta + \sin^4 \theta + \lambda = 0$ has real solutions for θ , then λ lies in the interval :

A $\left[-\frac{3}{2}, -\frac{5}{4}\right]$

B $\left(-\frac{1}{2}, -\frac{1}{4}\right]$

C $\left(-\frac{5}{4}, -1\right]$

D $\left[-1, -\frac{1}{2}\right]$

Ans - D

2 JEE Main 2020 (Online) 5th September Evening Slot

MCQ (Single Correct Answer)

If $L = \sin^2\left(\frac{\pi}{16}\right) - \sin^2\left(\frac{\pi}{8}\right)$ and

$M = \cos^2\left(\frac{\pi}{16}\right) - \sin^2\left(\frac{\pi}{8}\right)$, then :

A $L = -\frac{1}{2\sqrt{2}} + \frac{1}{2} \cos \frac{\pi}{8}$

B $M = \frac{1}{2\sqrt{2}} + \frac{1}{2} \cos \frac{\pi}{8}$

C $M = \frac{1}{4\sqrt{2}} + \frac{1}{4} \cos \frac{\pi}{8}$

D $L = \frac{1}{4\sqrt{2}} - \frac{1}{4} \cos \frac{\pi}{8}$

Ans - B

JEE MAINS 2019 PROBLEM SET : ONLINE

2 JEE Main 2019 (Online) 9th January Morning Slot

MCQ (Single Correct Answer)

For any $\theta \in \left(\frac{\pi}{4}, \frac{\pi}{2}\right)$, the expression

$$3(\cos \theta - \sin \theta)^4 + 6(\sin \theta + \cos \theta)^2 + 4\sin^6 \theta$$

equals :

A $13 - 4 \cos^2 \theta + 6 \sin^2 \theta \cos^2 \theta$

B $13 - 4 \cos^6 \theta$

C $13 - 4 \cos^2 \theta + 6 \cos^2 \theta$

D $13 - 4 \cos^4 \theta + 2 \sin^2 \theta \cos^2 \theta$

Ans - B

1 JEE Main 2019 (Online) 9th January Evening Slot

MCQ (Single Correct Answer)

If $0 \leq x < \frac{\pi}{2}$, then the number of values of x for which $\sin x - \sin 2x + \sin 3x = 0$, is :

A 3

B 1

C 4

D 2

Ans - D

4 JEE Main 2019 (Online) 10th January Morning Slot

MCQ (Single Correct Answer)

The sum of all values of $\theta \in (0, \frac{\pi}{2})$ satisfying

$$\sin^2 2\theta + \cos^4 2\theta = \frac{3}{4} \text{ is -}$$

A $\frac{5\pi}{4}$

B $\frac{\pi}{2}$

C π

D $\frac{3\pi}{8}$

Ans - B

3 JEE Main 2019 (Online) 10th January Evening Slot

MCQ (Single Correct Answer)

The value of $\cos \frac{\pi}{2^2} \cdot \cos \frac{\pi}{2^3} \cdot \dots \cdot \cos \frac{\pi}{2^{10}} \cdot \sin \frac{\pi}{2^{10}}$ is -

A $\frac{1}{256}$

B $\frac{1}{2}$

C $\frac{1}{1024}$

D $\frac{1}{512}$

Ans - D

2 JEE Main 2019 (Online) 12th January Morning Slot

MCQ (Single Correct Answer)

The maximum value of $3\cos\theta + 5\sin(\theta - \frac{\pi}{6})$ for any real value of θ is :

A $\sqrt{34}$

B $\sqrt{31}$

C $\sqrt{19}$

D $\frac{\sqrt{79}}{2}$

Ans - C

1 JEE Main 2019 (Online) 8th April Morning Slot

MCQ (Single Correct Answer)

If $\cos(\alpha + \beta) = 3/5$, $\sin(\alpha - \beta) = 5/13$ and $0 < \alpha, \beta < \frac{\pi}{4}$, then $\tan(2\alpha)$ is equal to :

A 21/16

B 63/52

C 33/52

D 63/16

Ans - D

4 JEE Main 2019 (Online) 9th April Morning Slot

MCQ (Single Correct Answer)

The value of $\cos^2 10^\circ - \cos 10^\circ \cos 50^\circ + \cos^2 50^\circ$ is

A $\frac{3}{2} + \cos 20^\circ$

B $\frac{3}{4}$

C $\frac{3}{2}(1 + \cos 20^\circ)$

D $\frac{3}{2}$

Ans - B

3 JEE Main 2019 (Online) 9th April Morning Slot

MCQ (Single Correct Answer)

Let $S = \{\theta \in [-2\pi, 2\pi] : 2\cos^2\theta + 3\sin\theta = 0\}$. Then the sum of the elements of S is

A π

B 2π

C $\frac{13\pi}{6}$

D $\frac{5\pi}{3}$

Ans - B

2 JEE Main 2019 (Online) 9th April Evening Slot

MCQ (Single Correct Answer)

The value of $\sin 10^\circ \sin 30^\circ \sin 50^\circ \sin 70^\circ$ is :-

A $\frac{1}{36}$

B $\frac{1}{16}$

C $\frac{1}{32}$

D $\frac{1}{18}$

Ans - B

1 JEE Main 2019 (Online) 12th April Morning Slot

MCQ (Single Correct Answer)

The number of solutions of the equation

$1 + \sin^4 x = \cos^2 3x$, $x \in \left[-\frac{5\pi}{2}, \frac{5\pi}{2}\right]$ is :

A 5

B 3

C 7

D 4

Ans - A

4 JEE Main 2019 (Online) 12th April Morning Slot

MCQ (Single Correct Answer)

The equation $y = \sin x \sin (x + 2) - \sin^2 (x + 1)$ represents a straight line lying in :

A first, second and fourth quadrants

B first, third and fourth quadrants

C second and third quadrants only

D third and fourth quadrants only

Ans - D

3 JEE Main 2019 (Online) 12th April Evening Slot

MCQ (Single Correct Answer)

If $[x]$ denotes the greatest integer $\leq x$, then the system of linear equations $[\sin \theta]x + [-\cos \theta]y = 0$, $[\cot \theta]x + y = 0$

- A** has a unique solution if $\theta \in \left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ and have infinitely many solutions if $\theta \in \left(\pi, \frac{7\pi}{6}\right)$
- B** have infinitely many solutions if $\theta \in \left(\frac{\pi}{2}, \frac{2\pi}{3}\right)$ and has a unique solution if $\theta \in \left(\pi, \frac{7\pi}{6}\right)$
- C** have infinitely many solutions if $\theta \in \left(\frac{\pi}{2}, \frac{2\pi}{3}\right) \cup \left(\pi, \frac{7\pi}{6}\right)$
- D** has a unique solution if $\theta \in \left(\frac{\pi}{2}, \frac{2\pi}{3}\right) \cup \left(\pi, \frac{7\pi}{6}\right)$

Ans - B