Assam CEE

Previous Year Question Papers

4101956

This Booklet contains 24+4 printed pages. **Question Booklet No. :**

Question Booklet for Combined Entrance Examination, 2014

Full Marks : 100 **MATHEMATICS** **Time : 2 Hours**

Question Booklet **SET : A**

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE ASKED TO DO SO

Read the following INSTRUCTIONS carefully :

1. **Use black ball pen only.**
2. Fill in the particulars on the **Side 1** and **Side 2** of the OMR Answer Sheet as per Instructions on the Side 1 of the OMR Answer Sheet, failing of which the OMR Answer Sheet shall not be evaluated.
3. The **SET** of this Question Booklet is **A**. Write this SET at the specific space provided on the Side 1 and Side 2 of the OMR Answer Sheet.
4. There are 100 (one hundred) questions in this Question Booklet, each carrying 1 (one) mark.
5. Each question or incomplete statement is followed by 4 (four) suggestive answers—[A], [B], [C] and [D] of which only **one** is correct. Mark the correct answer by darkening the appropriate circle in the OMR Answer Sheet.
6. Marking of **more than one** answer against any question will be treated as incorrect response and no mark shall be awarded.
7. **Any change in answer made or erased by using solid or liquid eraser in the OMR Answer Sheet will not be accepted. Therefore, do not change or erase once the answer is marked.**
8. No part of the Question Booklet or the OMR Answer Sheet shall be detached or defaced under any circumstances.
9. ***Use of mobile phone, calculator, log table, compass, scale and any electronic gadget is strictly prohibited in the Examination Hall.***
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SEAL

/4-A

1. From the numbers 1, 2, 3, ..., 30, three numbers are chosen at random. The probability that they will form a GP series with common ratio 2 or 3 is

1, 2, 3, ..., 30 সংখ্যাখিনিৰ পৰা তিনিটা সংখ্যা যাদৃচ্ছিকভাবে লোৱা হ'ল। এই সংখ্যা তিনিটাৰে 2 নাইবা 3 সাধাৰণ অনুপাতৰ এটা গুণোত্তৰ প্ৰগতি গঠন হোৱাৰ সম্ভাৱিতা হ'ল

[A] $\frac{1}{406}$

[B] $\frac{1}{203}$

[C] $\frac{3}{406}$

[D] None of the above

ওপৰৰ এটাও নহয়

2. A square is inscribed in a circle. The probability that a randomly selected point lies outside the square and inside the circle is

এটা বৰ্গক্ষেত্ৰ এটা বৃত্তৰ ভিতৰত সোমাই আছে। যাদৃচ্ছিকভাবে নিৰ্বাচন কৰা বিন্দু এটা বৰ্গক্ষেত্ৰৰ বাহিৰত আৰু বৃত্তৰ ভিতৰত হোৱাৰ সম্ভাৱিতা হ'ল

[A] $\frac{\pi}{2}$

[B] $1-\frac{2}{\pi}$

[C] $1+\frac{2}{\pi}$

[D] $\frac{2}{\pi}$

3. If \$ denotes +, ; denotes –, @ denotes ÷, # denotes ×, ϕ denotes =, α denotes > and β denotes <, then which of the following is true?

যদি \$ এ +, ; এ –, @ এ ÷, # এ ×, ϕ এ =, α এ > আৰু β এ < নিৰ্দেশ কৰে, তেন্তে তলৰ কোনটো সত্য ?

[A] 18 \$ 12 @ 4 α 7 \$ 8 # 2

[B] 27;18 @ 6 β 36 @ 6 # 2

[C] 25 \$ 6 @ 2 β 6;7 # 2

[D] 30 \$ 1;2 β 4 \$ 6 # 7

4. R is a relation on $A = \{1, 2, 3, 4\}$ as xRy, if x divides y, then R is

xRy হিচাবে R এটা $A = \{1, 2, 3, 4\}$ সংহতিত সম্বন্ধ, য'ত x এ y ক বিভাজ্য কৰে, তেন্তে, R হ'ল

[A] reflexive and symmetric
প্ৰতিফলনীয় আৰু প্ৰতিসম

[B] reflexive and transitive
প্ৰতিফলনীয় আৰু সংক্ৰামক

[C] transitive and symmetric
সংক্ৰামক আৰু প্ৰতিসম

[D] equivalence relation
সমতুল্য সম্বন্ধ

$\tan x + \sec x = \frac{2}{\sec x}$ $\Rightarrow \sec^2 x + \tan x - \sec x - 2 = 0$

$\Rightarrow \sec x = \frac{-\tan x \pm \sqrt{\tan^2 x + 8}}{2}$

5. Let $A = \{x : \tan x + \sec x = 2\cos x,\ x \in [0, 2\pi]\}$ and
$B = \{x : \sec x + 1 = (2+\sqrt{3})\tan x,\ x \in [0, 2\pi]\}$. Then

ধৰা হ'ল $A = \{x : \tan x + \sec x = 2\cos x,\ x \in [0, 2\pi]\}$ আৰু
$B = \{x : \sec x + 1 = (2+\sqrt{3})\tan x,\ x \in [0, 2\pi]\}$. তেন্তে

$\tan 75^\circ = 45^\circ + 30^\circ$

$\tan 75^\circ \tan x$

[A] $B \subset A$

[B] $A \subset B$

[C] $A \cap B = \phi$

[D] $A \cap B = \left\{\frac{\pi}{6}\right\}$

$\frac{1+\frac{1}{\sqrt{3}}}{1-\frac{1}{\sqrt{3}}} = \frac{(\sqrt{3}+1)}{(\sqrt{3}-1)} = \frac{3+1+2\sqrt{3}}{2} = (2+\sqrt{3})$

$\frac{1+\cos x}{\cos x} = (2+\sqrt{3})\frac{\sin x}{\cos x}$

$\Rightarrow 1+\cos x = (2+\sqrt{3})\sin x$

$\Rightarrow -\sin x \cdot \sin 75^\circ + \cos x \cdot \cos 75^\circ = 0$

$\Rightarrow \cos(75^\circ + x) = \cos(75^\circ)$

$\Rightarrow x = (n + 75^\circ)$

$\frac{\sin x}{\cos x} + \frac{1}{\cos x} = 2\cos x$

$\Rightarrow \sin x + 1 = 2\cos^2 x$

$= 2(1-\sin^2 x)$

$\Rightarrow 2\sin^2 x + \sin x - 1 = 0$

$\sin x = \frac{-1 \pm \sqrt{1+8}}{2 \cdot 2}$

$= \frac{-1 \pm 3}{2 \cdot 2}$

$= \frac{-4}{4}$ or $\frac{2}{4}$

$= -1$ or $\frac{1}{2}$

$x = n - 150$

$= 30$

6. Let $A = \{a, b, c\}$ and $B = \{i, j, k, l, m, n\}$. The number of one-one functions of A to B is

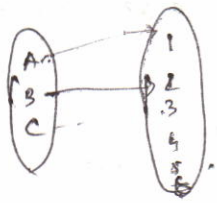
ধৰা হ'ল $A = \{a, b, c\}$ আৰু $B = \{i, j, k, l, m, n\}$. A ৰ পৰা B লৈ এক একৈকি ফলনৰ সংখ্যা হ'ল

[A] ${}^6C_3$

[B] 6^3

[C] ${}^6P_3$

[D] 3^6



$6 \times 5 \times 4$. ${}^6P_3 = \frac{6 \times 5 \times 4 \times 3}{3} = 3!$

7. If $\left|\frac{2z_1}{3z_2}\right|$ is purely imaginary, then the value of $\left|\frac{5z_1 - 9z_2}{5z_1 + 9z_2}\right|^2$ is equal to

$\frac{z_1}{z_2} = ai$

যদি $\frac{2z_1}{3z_2}$ বিশুদ্ধ কাল্পনিক হয়, তেন্তে $\left|\frac{5z_1 - 9z_2}{5z_1 + 9z_2}\right|$ ৰ মান হ'ব

$= \left(\frac{5z_1 - 9z_2}{5z_1 + 9z_2}\right)\left(\frac{5\bar{z}_1 - 9\bar{z}_2}{5\bar{z}_1 + 9\bar{z}_2}\right)$

$= \frac{(\quad - (\quad)}{25|z_1|^2 + 45(z_1\bar{z}_2 + z_2\bar{z}_1) + 81|z_2|^2}$

$\left|\frac{5\frac{z_1}{z_2} - 9}{5\frac{z_1}{z_2} + 9}\right|$

$= \frac{\frac{3}{2} \times 5a - 9}{\frac{3}{2} \times 5a + 9} =$

[A] 1

[B] 2

[C] 3

[D] 5

8. If $z^2 - iz = 1$, then $z^{14} + \frac{1}{z^{14}}$ is equal to

যদি $z^2 - iz = 1$, তেন্তে $z^{14} + \frac{1}{z^{14}}$ ৰ মান হ'ব

$z^2 - i \cdot z - 1 = 0$

$\Rightarrow z = \frac{i \pm \sqrt{-4+4}}{2}$

$= \frac{i \pm \sqrt{3}}{2} = \omega$ or ω^2

[A] -1

[B] 1

[C] 0

[D] ω

$\omega^{14} + \frac{1}{\omega^{14}}$

$= \omega^2 + \frac{1}{\omega^2}$

$= \frac{\omega + 1}{\omega^2} = \frac{-\omega^2}{\omega^2}$

$\frac{n(n+1)(2n+1)}{6} = \frac{11 \times 12 \times 23}{6}$

23
22
46
46
506

9. Let a, b, c be such three complex numbers, that $a^2+b^2>c^2 \Rightarrow a^2+b^2-c^2>0$. Then

ধৰা হ'ল a, b, c এনে কোনো তিনিটা জটিল সংখ্যা যাতে $a^2+b^2>c^2 \Rightarrow a^2+b^2-c^2>0$ হয়, তেন্তে

[A] a^2+b^2 and c^2 both are real
a^2+b^2 আৰু c^2 দুয়োটা বাস্তৱ

[B] a^2+b^2 and c^2 both are complex
a^2+b^2 আৰু c^2 দুয়োটা জটিল

[C] a^2+b^2 is real and c^2 is imaginary
a^2+b^2 বাস্তৱ আৰু c^2 কাল্পনিক

[D] a^2+b^2 is imaginary and c^2 is real
a^2+b^2 কাল্পনিক আৰু c^2 বাস্তৱ

10. Let $z_1=\cos\alpha-3ib$, $z_2=\frac{a+b}{2}i$ and $z_3=ci$, $(a, b, c \in R)$ $a \neq 2b$ be three non-collinear points. Then the curve represented by $z=\cos\alpha\sin^2\alpha+z_1\cos^2\alpha+z_2(1+\cos\alpha)+z_3$ where $z=x+iy$, is

ধৰা হ'ল $z_1=\cos\alpha-3ib$, $z_2=\frac{a+b}{2}i$ আৰু $z_3=ci$, $(a, b, c \in R)$ $a \neq 2b$ তিনিটা একেৰেখীয় নোহোৱা বিন্দু। তেন্তে $z=\cos\alpha\sin^2\alpha+z_1\cos^2\alpha+z_2(1+\cos\alpha)+z_3$, য'ত $z=x+iy$ নিৰ্দেশ কৰা বক্ৰ হ'ল

[A] straight line
সৰলৰেখা

[B] parabola
অধিবৃত্ত

[C] circle
বৃত্ত

[D] ellipse
উপবৃত্ত

$x+iy$
$= \cos\alpha\sin^2\alpha(1-\cos^2\alpha)$
$+ (\cos\alpha-3ib)\cdot\cos^2\alpha$
$+ \left(\frac{a+b}{2}\right)i\,(1+\cos\alpha)$
$+ ci$

$4^2 + (3i)^2 + 2\cdot4\cdot3i$

$= -\cos^3\alpha+\cos\alpha+\cos^3\alpha$
$-3ib\cos^2\alpha$
$+ \left(\frac{a+b}{2}\right)i + \frac{(a+b)}{2}i\cos\alpha$
$+ ci$

$x = \cos\alpha$
$y = -3b\cos^2\alpha$
$+\left(\frac{a+b}{2}\right)(1+\cos\alpha)$
$+ c$

11. If $a^4=7+24i$ and $b^4=7-24i$, then one of the values of $a+b$ is

যদি $a^4=7+24i$ আৰু $b^4=7-24i$, তেন্তে $a+b$ ৰ এটা মান হ'ল

[A] $\sqrt{2}$

[B] $2\sqrt{2}$

[C] $2\sqrt{3}$

[D] $3\sqrt{2}$

$a^2 = \sqrt{4+3i}$
$b^2 = \sqrt{4-3i}$
$(a+b)^2 = \sqrt{4+3i} + \sqrt{4-3i}$

12. Let $f: R \to R$ and $f(x+y)=f(x)+f(y)$. If $f(1)=1$, then $\sum_{i=1}^{11}\{f(i)\}^2$ is equal to

ধৰা হ'ল $f: R \to R$ আৰু $f(x+y)=f(x)+f(y)$. যদি $f(1)=1$ হয়, তেন্তে $\sum_{i=1}^{11}\{f(i)\}^2$ ৰ মান হ'ব

[A] 502

[B] 506

[C] 605

[D] 560

$1^2+2^2+\cdots \Rightarrow$

$= 4+3i+4-3i$
$+ 2\sqrt{16+9}$

$f(2) = 1+1$
$= 2$

$f(3)$
$= f(2)+1$
$= 2+1$

$= 8 + 2\times5 = 18$
$= 2\times2$
$= 3\sqrt{2}$

13. If $a^2b^{11} = 2^{23}$, where a and b are positive integers, then the number of ordered pairs (a, b) is

যদি $a^2b^{11} = 2^{23}$ হয়, য'ত a আৰু b ধনাত্মক অখণ্ড সংখ্যা, তেন্তে (a, b) ৰ ক্ৰমযোৰৰ সংখ্যা হ'ল

[A] 4 [B] 3

[C] 2 [D] 1

14. The difference between the number of subsets of sets A and B is 28. If $A \cup B$ has 5 members, then the member(s) of $A \cap B$ is/are

A আৰু B সংহতিৰ উপসংহতিসমূহৰ পাৰ্থক্য হ'ল 28. যদি $A \cup B$ ত 5টা মৌল থাকে, তেন্তে $A \cap B$ ত থকা মৌলৰ সংখ্যা হ'ল

[A] 1 [B] 2

[C] 5 [D] 7

15. Let $A = [a_{ij}]_{2\times 2}$ and $B = [b_{ij}]$, where $b_{ij} = 3^{i+j}a_{ij}$, $1 \le i, j \le 2$. If $|A| = 3$, then $|B \operatorname{adj} B|$ is equal to

ধৰা হ'ল $A = [a_{ij}]_{2\times 2}$ আৰু $B = [b_{ij}]$, য'ত $b_{ij} = 3^{i+j}a_{ij}$, $1 \le i, j \le 2$. যদি $|A| = 3$ হয়, তেন্তে $|B \operatorname{adj} B|$ ৰ মান হ'ব

[A] 3^8 [B] 3^6

[C] 3^{14} [D] 3^3

16. If

$$A = \begin{bmatrix} a & b & c \\ x & y & z \\ l & m & n \end{bmatrix}_{3\times 3}, \quad B = \begin{bmatrix} m & -b & y \\ -l & a & -x \\ n & -c & z \end{bmatrix}_{3\times 3}$$

and $|A| = K$, then $|B|$ is equal to

যদি

$$A = \begin{bmatrix} a & b & c \\ x & y & z \\ l & m & n \end{bmatrix}, \quad B = \begin{bmatrix} m & -b & y \\ -l & a & -x \\ n & -c & z \end{bmatrix}$$

আৰু $|A| = K$ হয়, তেন্তে $|B|$ ৰ মান হ'ব

[A] K [B] $\frac{1}{K}$

[C] K^2 [D] $-K$

17. Quadratic equation $ax^2 + bx + c = 0,\ a \neq 0,\ a > 0$ has positive distinct roots which are reciprocal of each other. Then $2a + b$ is

$ax^2 + bx + c = 0,\ a \neq 0,\ a > 0$ দ্বিঘাত সমীকৰণৰ দুটা ধনাত্মক পৃথক মূল আছে, যি দুটা এটা আনটোৰ প্ৰতিসম। তেন্তে $2a + b$ ৰ মান হ'ল

[A] < 0

[B] > 0

[C] 0

[D] Cannot be determined
নিৰ্দ্ধাৰণ কৰিব নোৱাৰি

18. If the roots of the equation $a^2x^2 + b^2x + 16 - a^2 - b^2 = 0$ are opposite in sign, then the point (a, b) lies outside a circle having centre at the origin. The maximum length of the radius of the circle is

$a^2x^2 + b^2x + 16 - a^2 - b^2 = 0$ সমীকৰণৰ মূল দুটা বিপৰীত চিনযুক্ত; তেন্তে (a, b) বিন্দুটো মূলবিন্দুত কেন্দ্ৰ থকা এটা বৃত্তৰ বাহিৰত থাকে। বৃত্তটোৰ সৰ্বোচ্চ ব্যাসাৰ্দ্ধ হ'ল

[A] 3

[B] 4

[C] 5

[D] 2

19. If $f(x) = ax^2 + c,\ a \neq 0$ and $f'(a), f'(b), f'(c)$ are in AP, then a, b, c are in

যদি $f(x) = ax^2 + c,\ a \neq 0$ আৰু $f'(a), f'(b), f'(c)$ সমান্তৰ প্ৰগতিত থাকে, তেন্তে a, b, c থাকিব

[A] AP
সমান্তৰ প্ৰগতিত

[B] GP
গুণোত্তৰ প্ৰগতিত

[C] HP
হৰাত্মক প্ৰগতিত

[D] None of the above
ওপৰৰ এটাও নহয়

20. In a sequence, the sum of the first n terms is given by the relation $7S_n = T_n^2 + 5T_n + 1$, then T_1 is

এটা অনুক্ৰমৰ প্ৰথম n টা পদৰ যোগফলৰ সম্বন্ধটো হ'ল $7S_n = T_n^2 + 5T_n + 1$, তেন্তে T_1 হ'ল

[A] -1

[B] 2

[C] 1

[D] 0

21. The coefficients of three consecutive terms in the expansion of $(1+x)^{n+4}$ are in the ratio $3:8:14$. Then n is equal to

$(1+x)^{n+4}$ বিস্তাৰত তিনিটা একাদিক্ৰম পদৰ সহগৰ অনুপাত হ'ব $3:8:14$, তেন্তে nৰ মান হ'ব

[A] 5 [B] 7

[C] 8 [D] 6

22. $f(x)=\sqrt{\log_{25} x^2}$ is a real valued function. The domain of $f(x)$ is

$f(x)=\sqrt{\log_{25} x^2}$ এটা বাস্তৱ ফলন। $f(x)$ ৰ আদি ক্ষেত্ৰ হ'ল

[A] $\{x : |x| \geq 5\}$ [B] $\{x : |x| \geq 1\}$

[C] $\{x : |x| \geq 0\}$ [D] None of the above
ওপৰৰ এটাও নহয়

23. $\lim\limits_{x\to 0} \dfrac{\log_e(2+x^2)+\log_e \frac{1}{2}}{x^2}$ is equal to

$\lim\limits_{x\to 0} \dfrac{\log_e(2+x^2)+\log_e \frac{1}{2}}{x^2}$ ৰ মান হ'ব

[A] 1 [B] 2

[C] $\frac{1}{2}$ [D] 0

24. If

$$y=\log\frac{x+1}{\sqrt{x^2-x+1}}+\sqrt{3}\tan^{-1}\frac{2x-1}{\sqrt{3}}$$

then $\dfrac{dy}{dx}$ is equal to

যদি

$$y=\log\frac{x+1}{\sqrt{x^2-x+1}}+\sqrt{3}\tan^{-1}\frac{2x-1}{\sqrt{3}}$$

তেন্তে $\dfrac{dy}{dx}$ হ'ব

[A] $\dfrac{1}{1+x^3}$ [B] $\dfrac{1}{1+x^2}$

[D] $\dfrac{3}{1+x^3}$

25. $f(x) = \cos^{-1}\dfrac{1-x^2}{1+x^2} + \log x$ is a/an

$f(x) = \cos^{-1}\dfrac{1-x^2}{1+x^2} + \log x$ এটা

[A] increasing function
বৰ্ধিত ফলন

[B] decreasing function
হ্ৰাসমান ফলন

[C] even function
যুগ্ম ফলন

[D] odd function
অযুগ্ম ফলন

26. If $y^2e^x = x$, then $\int (e^{-x} - y^2)dx$ is equal to

যদি $y^2e^x = x$, তেন্তে $\int (e^{-x} - y^2)dx$ ৰ মান হ'ব

[A] $y + c$

[B] $y^2 + c$

[C] $\dfrac{1}{y^2} + c$

[D] $\dfrac{1}{y} + c$

27. Let $f(x)$ be a function defined and differentiable in $R - \{0\}$ and $g(x) = \dfrac{f(x)}{2} + \dfrac{f(x)}{e^x - 1}$ is an even function. Then

$R - \{0\}$ ত $f(x)$ ফলন সংজ্ঞাবদ্ধ আৰু অৱকলনীয়; আৰু $g(x) = \dfrac{f(x)}{2} + \dfrac{f(x)}{e^x - 1}$ এটা যুগ্ম ফলন। তেন্তে

[A] $f'(-x) = -f'(x)$

[B] $f'(-x) = f(x)$

[C] $f'(-x) = -f(x)$

[D] $f'(-x) = f'(x)$

28. $f(x) = \int_1^x (y^2 - 3y + 2)^3 (y-2)^2 (y-3)^7 \, dy$ has a maximum at

$f(x) = \int_1^x (y^2 - 3y + 2)^3 (y-2)^2 (y-3)^7 \, dy$ ৰ সৰ্বোচ্চ মান থকা বিন্দুটো হ'ল

[A] 2

[B] 1

[C] 3

[D] 5

29. $\int_{-a}^{a} \cos^{-1} x\,dx,\ a>0$ is equal to

$\int_{-a}^{a} \cos^{-1} x\,dx,\ a>0$ ৰ মান হ'ব

[A] $2\pi a$

[B] πa

[C] a

[D] $\frac{\pi}{2}a$

30. $\int_{0}^{\frac{\pi}{2}} |\cos x - \sin x|\,dx =$

[A] $2(\sqrt{2}-1)$

[B] $\sqrt{2}-1$

[C] $2\sqrt{2}$

[D] $\sqrt{2}$

31. $f(x) = x^2 - x\sin x - \cos x,\ x \in (0, \infty)$ is a/an

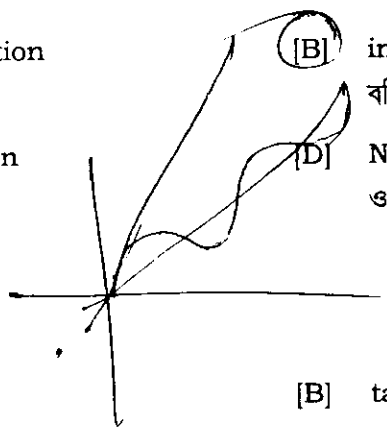
$f(x) = x^2 - x\sin x - \cos x,\ x \in (0, \infty)$ এটা

[A] decreasing function
হ্ৰাসমান ফলন

[B] increasing function
বৰ্ধিত ফলন

[C] constant function
ধ্ৰুৱক ফলন

[D] None of the above
ওপৰৰ এটাও নহয়



32. $\int \frac{1}{(x+3)\sqrt{x+2}}\,dx =$

[A] $\tan^{-1}\sqrt{x+2}+c$

[B] $\tan^{-1} x + c$

[C] $2\tan^{-1}\sqrt{x+2}+c$

[D] $2\tan^{-1}(x+2)+c$

33. Let $f : R \to R$ be a function such that $f(x+y) = f(x) + f(y),\ \forall x, y \in R$ and $f(x)$ is differentiable in R. Then $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h} =$

ধৰা হ'ল $f : R \to R$ এটা ফলন, য'ত $f(x+y) = f(x) + f(y),\ \forall x, y \in R$ আৰু R ত $f(x)$ অৱকলনীয়। তেন্তে $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h} =$

[A] $f'(1)$

[B] $f'(h)$

[C] $f(0)$

[D] $f'(0)$

34. The area bounded by $y = x^4$, $y = 5$ and $x = 0$ is

$y = x^4$, $y = 5$ আৰু $x = 0$ বক্ৰই আগুৰা ক্ষেত্ৰৰ কালি হ'ল

[A] $4\sqrt[4]{5}$ [B] $4\sqrt{5}$

[C] $5\sqrt{4}$ [D] $5\sqrt[4]{4}$

35. The area bounded by $y = \log(x-3)$, x-axis and $x = 5$ is

$y = \log(x-3)$, x-অক্ষ আৰু $x = 5$ বক্ৰই আগুৰা ক্ষেত্ৰৰ কালি হ'ল

[A] $\log 2 - 1$ [B] $2\log 2 - 1$

[C] $2\log 2$ [D] $2\log 2 + 1$

36. The slope of tangent at (x, y), to a curve $y = f(x)$ passing through (1, 1), is given by $x^3 - \frac{2y}{x}$, then $f'(1)$ is equal to

(1, 1) বিন্দুৰ মাজেৰে পাৰহৈ যোৱা $y = f(x)$ বক্ৰৰ (x, y) বিন্দুত টনা স্পৰ্শকডালৰ ঢাল হ'ল $x^3 - \frac{2y}{x}$, তেন্তে $f'(1)$ ৰ মান হ'ব

[A] 2 [B] –2

[C] 1 [D] –1

37. If the second term of an infinite GP is 4 and sum to infinite terms is 16, then the first term is

এটা অসীম গুণোত্তৰ প্ৰগতিৰ দ্বিতীয় পদ 4 আৰু অসীম পদলৈ যোগফল 16 হ'লে, প্ৰথম পদ হ'ল

[A] 16 [B] 12

[C] 10 [D] 8

38. For $x \in \left[\pi, \frac{3\pi}{2}\right]$, $y = \sin^{-1}[\cos\{\cos^{-1}(\cos x) - \sin^{-1}(\sin x)\}]$ is equal to

$x \in \left[\pi, \frac{3\pi}{2}\right]$ ৰ বাবে $y = \sin^{-1}[\cos\{\cos^{-1}(\cos x) - \sin^{-1}(\sin x)\}]$ ৰ মান হ'ব

[A] $-\frac{\pi}{2}$ [B] $\frac{\pi}{2}$

[C] π [D] None of the above

ওপৰৰ এটাও নহয়

39. $f(x) = \sin^{-1}(\text{cosec}(\sin^{-1} x)) + \cos^{-1}(\sec(\cos^{-1} x))$ is defined for how many values of x?

x ৰ কেইটা মানৰ বাবে $f(x) = \sin^{-1}(\text{cosec}(\sin^{-1} x)) + \cos^{-1}(\sec(\cos^{-1} x))$ সংজ্ঞাবদ্ধ ?

[A] One value
এটা মানৰ বাবে

[B] Two values
দুটা মানৰ বাবে

[C] No value
কোনো মান নাই

[D] Infinite numbers of values
অসীম সংখ্যক মানৰ বাবে

40. If $y = \cot^{-1}(\sqrt{\cos x}) - \frac{1}{2}\cos^{-1}\left(\frac{1-\cos x}{1+\cos x}\right)$, then $\sin y$ is equal to

যদি $y = \cot^{-1}(\sqrt{\cos x}) - \frac{1}{2}\cos^{-1}\left(\frac{1-\cos x}{1+\cos x}\right)$, তেন্তে $\sin y$ ৰ মান হ'ব

[A] $\cot^2 \frac{x}{2}$

[B] $\cos^2 \frac{x}{2}$

[C] $\tan^2 \frac{x}{2}$

[D] $\sin^2 \frac{x}{2}$

41. If $\cot x + |\text{cosec}\, x| = |\cot x|$, $x \in (0, \pi]$, then x is equal to

যদি $\cot x + |\text{cosec}\, x| = |\cot x|$, $x \in (0, \pi]$, তেন্তে x ৰ মান হ'ব

[A] $\frac{\pi}{3}$

[B] $\frac{\pi}{6}$

[C] $\frac{\pi}{2}$

[D] $\frac{2\pi}{3}$

42. If $x\sin\theta - y\cos\theta = \sqrt{x^2 + y^2}$, then $x\cos\theta + y\sin\theta$ is equal to

যদি $x\sin\theta - y\cos\theta = \sqrt{x^2 + y^2}$, তেন্তে $x\cos\theta + y\sin\theta$ ৰ মান হ'ব

[A] 0

[B] x

[C] y

[D] 1

43. If $\sin^{-1}(5x^2 + 3ax + 5a) + \cos^{-1}(x^2 - ax + 6) = \frac{\pi}{2}$ for at least one real x, then a cannot lie in the interval

অন্ততঃ x ৰ এটা বাস্তৱ মানৰ বাবেও যদি $\sin^{-1}(5x^2 + 3ax + 5a) + \cos^{-1}(x^2 - ax + 6) = \frac{\pi}{2}$, তেন্তে a নথকা অন্তৰালটো হ'ব

[A] [2, 3]

[B] (2, 3)

[C] (2, 3]

[D] [2, 3]

44. If $\tan(2\tan x) = \cot(2\cot x)$, $0 < x < \frac{\pi}{2}$, then $2\operatorname{cosec} 2x$ is equal to

যদি $\tan(2\tan x) = \cot(2\cot x)$, $0 < x < \frac{\pi}{2}$, তেন্তে $2\operatorname{cosec} 2x$ ৰ মান হ'ব

[A] $\frac{\pi}{6}$ [B] $\frac{\pi}{3}$

[C] $\frac{\pi}{4}$ [D] $\frac{\pi}{8}$

45. If $\cos x = -\frac{3}{5}$, where $x \in [0, \pi]$, then the value of $\sin\frac{x}{2}$ is equal to

যদি $\cos x = -\frac{3}{5}$, য'ত $x \in [0, \pi]$, তেন্তে $\sin\frac{x}{2}$ ৰ মান হ'ব

[A] $-\frac{2}{\sqrt{5}}$ [B] $\frac{2}{\sqrt{5}}$

[C] $\frac{1}{\sqrt{5}}$ [D] $-\frac{1}{\sqrt{5}}$

46. ABC is an equilateral triangle and its centroid is at origin. The base BC is along the line $6x + 8y = 25$, then the perimeter of the triangle is

ABC এটা সমবাহু ত্ৰিভুজ আৰু ইয়াৰ ভৰকেন্দ্ৰ মূলবিন্দুত আছে। ভূমি BC, $6x + 8y = 25$ ৰেখাডালত আছে, তেন্তে ত্ৰিভুজটোৰ পৰিসীমা হ'ল

[A] $12\sqrt{3}$ units [B] $3\sqrt{3}$ units

[C] $15\sqrt{3}$ units [D] $3\sqrt{15}$ units

47. If the angles of a triangle are in the ratio $3 : 4 : 5$, then the sides are in the ratio

এটা ত্ৰিভুজৰ কোণকেইটাৰ অনুপাত $3 : 4 : 5$, তেন্তে সিহঁতৰ বাহুকেইটাৰ অনুপাত হ'ব

[A] $\sqrt{2} : \sqrt{6} : \sqrt{3} + 1$ [B] $\sqrt{2} : 2 : \sqrt{3} + 1$

[C] $\sqrt{2} : 2 : \sqrt{3}$ [D] $2 : \sqrt{6} : \sqrt{3} + 1$

48. $\tan\left(\sum_{k=1}^{2014}\cot^{-1}(k^2+k+1)\right)$ is equal to

$\tan\left(\sum_{k=1}^{2014}\cot^{-1}(k^2+k+1)\right)$ ৰ মান হ'ব

[A] $\frac{1007}{1008}$

[B] $\frac{1008}{1007}$

[C] $\frac{1}{2014}$

[D] None of the above

ওপৰৰ এটাও নহয়

$\tan^{-1}\left\{\frac{(k+1)-k}{1+k(k+1)}\right\}$

$= \tan^{-1}\{(k+1) - \tan^{-1}(k)$

$= \tan 2 - \tan^{-1} 1$

$\tan 3 - \tan^{-1} 2$

$\tan^{-1}\{2015\} - \tan^{-1}(1)$

$\tan = \left\{\frac{2014}{1+2015}\right\}$

$= \frac{2014}{2016}$

$= \left(\frac{1007}{1008}\right)$

49. In triangle ABC, if $\frac{s-a}{4}=\frac{s-b}{5}=\frac{s-c}{6}$, then

ABC ত্ৰিভুজত $\frac{s-a}{4}=\frac{s-b}{5}=\frac{s-c}{6}$, তেন্তে

[A] b, a, c are in AP
$b, a, c,$ AP ত থাকিব

[B] $a, b, 2c$ are in AP
$a, b, 2c,$ AP ত থাকিব

[C] a, b, c are in AP
$a, b, c,$ AP ত থাকিব

[D] $2a, b, c$ are in AP
$2a, b, c,$ AP ত থাকিব

50. In a triangle ABC, $a=5$, $b=14$, $\sin A=\frac{2}{5}$, then the number of possible triangles is

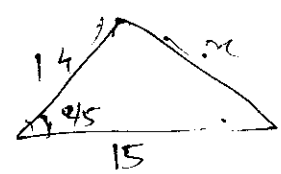
এটা ABC ত্ৰিভুজৰ বাবে $a=5$, $b=14$, $\sin A=\frac{2}{5}$, তেন্তে সম্ভাব্য ত্ৰিভুজৰ সংখ্যা হ'ল

[A] 1

[B] 2

[C] 3

[D] 0



$\frac{a}{\sin A} = \frac{b}{c}$

$\Rightarrow \frac{5a}{2/5} = \frac{14}{1}$

$\Rightarrow a = \left(\frac{28}{25}\right) + 14 > 5$

51. The value of $\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right)+\tan^{-1}(\sqrt{3})$, using principal values, is

মুখ্য মান ব্যৱহাৰ কৰি, $\cos^{-1}\left(-\frac{1}{\sqrt{2}}\right)+\tan^{-1}(\sqrt{3})$ ৰ মান হ'ল

[A] $\frac{13\pi}{12}$

[B] $\frac{12\pi}{13}$

[C] $\frac{10\pi}{11}$

[D] $\frac{5\pi}{7}$

$\frac{3\pi}{4} + \frac{\pi}{3} = \frac{9\pi+4\pi}{12}$

52. If $|\vec{a}| = 2$, $|\vec{b}| = 2\sqrt{2}$, $\vec{a}.\vec{b} = 2\sqrt{6}$ and $\vec{b} + \vec{c} = 3\vec{a} \times \vec{b}$, then $|\vec{c}|^2$ is

যদি $|\vec{a}| = 2$, $|\vec{b}| = 2\sqrt{2}$, $\vec{a}.\vec{b} = 2\sqrt{6}$ আৰু $\vec{b} + \vec{c} = 3\vec{a} \times \vec{b}$, তেন্তে $|\vec{c}|^2$ হ'ল

[A] 72 [B] 80

[C] 84 [D] 108

53. If $2\vec{a} + 3\vec{b} = 2\hat{i} - \hat{j} + 2\hat{k}$ and $\vec{a} - \vec{b} = \hat{i} + 2\hat{j} + \hat{k}$, and θ is the angle between $\vec{a}$ and $\vec{b}$, then cosθ is equal to

যদি $2\vec{a} + 3\vec{b} = 2\hat{i} - \hat{j} + 2\hat{k}$ আৰু $\vec{a} - \vec{b} = \hat{i} + 2\hat{j} + \hat{k}$, $\vec{a}$ আৰু $\vec{b}$ ৰ মাজৰ কোণটো θ হ'লে, cosθ ৰ মান হ'ব

[A] $\frac{1}{\sqrt{3}}$ [B] $\frac{1}{\sqrt{2}}$

[C] $-\frac{1}{\sqrt{3}}$ [D] $-\frac{1}{\sqrt{2}}$

54. If $\vec{a}.\vec{b} = \vec{a}.\vec{c}$, $\vec{a} \times \vec{b} = \vec{a} \times \vec{c}$, $\vec{a} \neq 0$, then

যদি $\vec{a}.\vec{b} = \vec{a}.\vec{c}$, $\vec{a} \times \vec{b} = \vec{a} \times \vec{c}$, $\vec{a} \neq 0$, তেন্তে

[A] $\vec{b} \neq \vec{c}$ [B] $\vec{b} \perp \vec{c}$

[C] $\vec{b} + \vec{c} = 0$ [D] None of the above

ওপৰৰ এটাও নহয়

55. The distance of the point (3, 2, 1) from the line $\vec{r} = (\hat{i} + \hat{j} + \hat{k}) + s(5\hat{i} + 4\hat{j} + 3\hat{k})$; $s \in R$, is

(3, 2, 1) বিন্দুৰ পৰা $\vec{r} = (\hat{i} + \hat{j} + \hat{k}) + s(5\hat{i} + 4\hat{j} + 3\hat{k})$; $s \in R$, ৰেখাডালৰ দূৰত্ব হ'ল

[A] $\frac{3}{5}$ [B] $\frac{\sqrt{3}}{5}$

[C] $\frac{1}{5}$ [D] $\frac{3\sqrt{3}}{5}$

56. Let $A = \{x\hat{i} + y\hat{j} + z\hat{k} : x, y, z \in \{-n, n\}, n \in N\}$ be a set of vectors. The number of coplanar vectors is

ধৰা হ'ল $A = \{x\hat{i} + y\hat{j} + z\hat{k} : x, y, z \in \{-n, n\}, n \in N\}$ এটা সদিশ ৰাশিৰ সংহতি। সমতলীয় সদিশ ৰাশিৰ সংখ্যা হ'ল

[A] 24 [B] 16

[C] 8 [D] 12

57. If two circles $x^2+y^2+8x+10y+41=k^2$ and $x^2+y^2-4x-6y+4=0$ intersect in two distinct points, then

যদি দুটা বৃত্ত $x^2+y^2+8x+10y+41=k^2$ আৰু $x^2+y^2-4x-6y+4=0$ এ দুটা পৃথক বিন্দুত ছেদ কৰে, তেন্তে

[A] $k<13$

[B] $k>7$

[C] $7<k<13$

[D] $3<k<10$

58. The area of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, where $a=\frac{1}{e\sqrt{1-e^2}}$ will be minimum if

$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$, য'ত $a=\frac{1}{e\sqrt{1-e^2}}$, উপবৃত্তৰ কালি ন্যূনতম হ'ব, যেতিয়া

[A] $e=\sqrt{\frac{3}{5}}$

[B] $e=\frac{1}{\sqrt{3}}$

[C] $e=\frac{1}{\sqrt{2}}$

[D] $e=\sqrt{\frac{2}{3}}$

59. The equation of the tangent, to the parabola $5x^2=3y$, which passes through the point $\left(\frac{1}{2}, 2\right)$ is

$5x^2=3y$ অধিবৃত্তৰ $\left(\frac{1}{2}, 2\right)$ বিন্দুৰ মাজেৰে পাৰহৈ যোৱা স্পৰ্শকৰ সমীকৰণ হ'ল

[A] $y=x+\frac{3}{20}$

[B] $y=-x+\frac{3}{20}$

[C] $2y=x+\frac{3}{20}$

[D] None of the above

ওপৰৰ এটাও নহয়

60. The equation of normal to $x^2+4y^2=4$ at the point $\theta=\frac{\pi}{4}$ is

$\theta=\frac{\pi}{4}$ বিন্দুত $x^2+4y^2=4$ ৰ অভিলম্বৰ সমীকৰণ হ'ল

[A] $2x-y=\frac{3}{\sqrt{2}}$

[B] $2x+y=\frac{3}{\sqrt{2}}$

[C] $x+2y=2\sqrt{2}$

[D] $x-2y=2\sqrt{2}$

61. For the hyperbola $\frac{x^2}{k}+\frac{y^2}{k^2}=1,\ k<0$, which one of the following is correct?

পৰাবৃত্ত $\frac{x^2}{k}+\frac{y^2}{k^2}=1,\ k<0$ ৰ বাবে তলৰ কোনটো সত্য ?

[A] Vertex is at $(0, \pm k^2)$

শীৰ্ষবিন্দু $(0, \pm k^2)$ ত

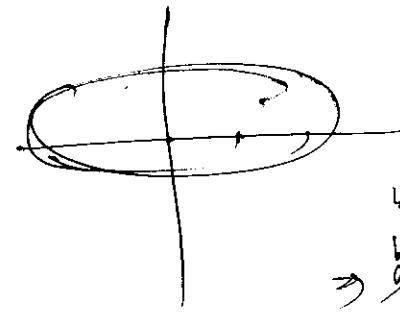
[B] $e=\sqrt{1-\frac{1}{k}}$

[C] Foci at $\left(0, \pm k^2\sqrt{1-\frac{1}{k}}\right)$

নাভি $\left(0, \pm k^2\sqrt{1-\frac{1}{k}}\right)$ ত

[D] None of the above is correct

ওপৰৰ এটাও সত্য নহয়



$b^2=a^2(1-e^2)$

$\Rightarrow \cancel{k^2}=\cancel{k}(1-e^2)$

$\Rightarrow k=1-e^2$

$\Rightarrow e^2=\sqrt{1-k}$

62. The area bounded by the parabola $y^2=4x$ and the circle $x^2+y^2-2x=3$ in the first quadrant is

প্ৰথম পাদত অধিবৃত্ত $y^2=4x$ আৰু বৃত্ত $x^2+y^2-2x=3$ ৰে আগুৰা ক্ষেত্ৰৰ কালি হ'ল

$x^2+y^2-2x-3=0$

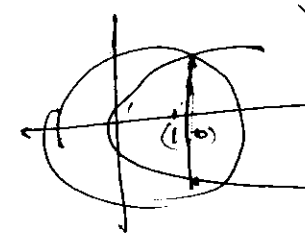
$1+3$

[A] $\frac{4}{3}$

[B] π

[C] $\frac{4}{3}+\pi$

[D] $\frac{4}{3}-\pi$



63. If the circle $(x-h)^2+(y-k)^2=r^2$ touches the x-axis, then

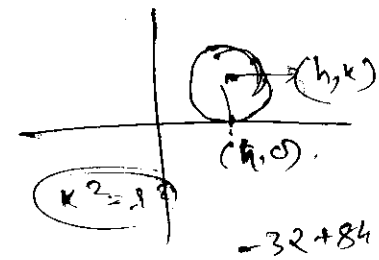
যদি বৃত্ত $(x-h)^2+(y-k)^2=r^2$ এ x-অক্ষ স্পৰ্শ কৰে, তেন্তে

[A] $h=r$

[B] $h=k$

[C] $h^2+k^2=r^2$

[D] $k=r$



$k^2=r^2$

$-32+84+13$

27
32
65

64. The image of the point (–8, 12) with respect to the line mirror $4x+7y+13=0$, is

$4x+7y+13=0$ ৰেখা আৰ্চি হিচাবে (–8, 12) বিন্দুৰ প্ৰতিবিম্ব হ'ল

$64+16$

[A] (–16, –2)

[B] (16, –2)

[C] (–16, 2)

[D] (16, 2)

$\frac{x+8}{4}=\frac{y-12}{7}$

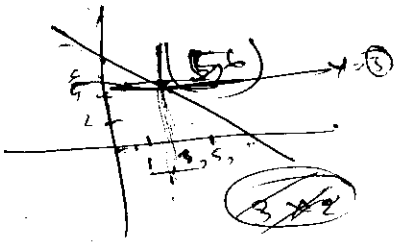
$=-2\times\left\{\frac{65}{\sqrt{65}}\right\}$

65. A straight line passes through the point (5, 6) is such that its x-intercept is an odd positive integer and y-intercept is a positive integer. The number of such lines is

এডাল সৰলৰেখা (5, 6) ৰ মাজেৰে পাৰহৈ যায় যাতে x-ছেদাংশ এটা ধনাত্মক অযুগ্ম অখণ্ড সংখ্যা আৰু y-ছেদাংশ এটা ধনাত্মক অখণ্ড সংখ্যা হয়, তেন্তে এনেধৰণৰ সৰলৰেখাৰ সংখ্যা হ'ল

[A] 6 [B] 4

[C] 7 [D] 15



66. The equation of the plane perpendicular to the yz-plane and passing through the points (1, 2, –2) and (2, 1, –3) is

yz-সমতলৰ লম্ব আৰু (1, 2, –2) আৰু (2, 1, –3) বিন্দুৰ মাজেৰে পাৰহৈ যোৱা সমতলৰ সমীকৰণ হ'ল

[A] $y+z=4$ [B] $y-z=-4$

[C] $y-z=4$ [D] $y-z=2$

67. The fractional part of $\frac{5^{2n}}{12}$; $n \in N$, is

$\frac{5^{2n}}{12}$; $n \in N$, ৰ ভগ্নাংশৰ অংশ হ'ল

[A] $\frac{1}{6}$ [B] $\frac{1}{25}$

[C] $\frac{5}{12}$ [D] $\frac{1}{12}$

68. The maximum number of intersecting points of 11 straight lines in a plane is

এখন সমতলত 11 ডাল সৰলৰেখাই পৰস্পৰ ছেদ কৰা সৰ্বোচ্চ সংখ্যক বিন্দু হ'ল

[A] 44 [B] 55

[C] 52 [D] 46

$^{11}C_2 = \frac{11 \times 10}{2}$

69. The lengths of the sides of a triangle are decided by throwing a die thrice, the probability that the triangle is isosceles is

যদি এটা ত্ৰিভুজৰ বাহুসমূহ, লুডুগুটি এটা তিনিবাৰ দলিয়াই নিৰ্ধাৰণ কৰা হয়, তেন্তে ত্ৰিভুজটো সমদ্বিবাহু হোৱাৰ সম্ভাৱিতা হ'ল

[A] $\frac{1}{6^3}$

[B] $\frac{5}{72}$

[C] $\frac{7}{72}$

[D] $\frac{1}{72}$

70. If A is the area and $2s$ is the perimeter of a triangle, then

যদি এটা ত্ৰিভুজৰ কালি A আৰু পৰিসীমা $2s$ হয়, তেন্তে

[A] $4A = s^2$

[B] $A > s^2$

[C] $A^2 < s^2$

[D] $4A < s^2$

71. The intercepts made by the plane $3x+2y+z=6$ on the axes are in

$3x+2y+z=6$ সমতলখনে অক্ষকেইডালৰ পৰা কটা ছেদাংশসমূহ থাকিব

[A] HP
হৰাত্মক প্ৰগতিত

[B] AP
সমান্তৰ প্ৰগতিত

[C] GP
গুণোত্তৰ প্ৰগতিত

[D] None of the above
ওপৰৰ এটাও নহয়

72. The number of solutions of the set of equations

$\frac{2x^2}{a^2}-\frac{y^2}{b^2}-\frac{z^2}{c^2}=0,\ \frac{x^2}{a^2}-\frac{2y^2}{b^2}+\frac{z^2}{c^2}=0$ and $\frac{x^2}{a^2}+\frac{y^2}{b^2}-\frac{2z^2}{c^2}=0$, where $(a, b, c \in R-\{0\})$, is

$\frac{2x^2}{a^2}-\frac{y^2}{b^2}-\frac{z^2}{c^2}=0,\ \frac{x^2}{a^2}-\frac{2y^2}{b^2}+\frac{z^2}{c^2}=0$ আৰু $\frac{x^2}{a^2}+\frac{y^2}{b^2}-\frac{2z^2}{c^2}=0$, য'ত $(a, b, c \in R-\{0\})$ সমীকৰণ প্ৰণালীৰ সমাধানৰ সংখ্যা হ'ল

[A] 3

[B] 6

[C] 9

[D] 7

73. The orthocenter of the triangle formed by the lines $x=0$, $y=0$ and $x+y=1$ is

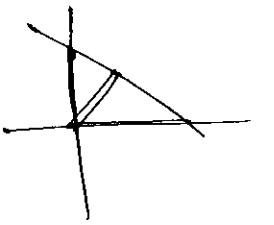
$x=0$, $y=0$ আৰু $x+y=1$ ৰেখাই উৎপন্ন কৰা ত্ৰিভুজৰ লাম্বিক কেন্দ্ৰটো হ'ল

[A] (0, 0)

[B] (1, 1)

[C] (0, 1)

[D] (1, 0)



74. $f:[1,\infty)\to[2,\infty)$ is given by $f(x)=x+\frac{1}{x}$, then $f^{-1}(x)$ equals

$f:[1,\infty)\to[2,\infty)$ যাতে $f(x)=x+\frac{1}{x}$, তেন্তে $f^{-1}(x)$ হ'ব

[A] $\frac{x+\sqrt{x^2-4}}{2}$

[B] $\frac{x}{1+x^2}$

[C] $\frac{x-\sqrt{x^2-4}}{2}$

[D] $1+\sqrt{x^2-4}$

75. The number of points in which the function $[\sin(x)]+[\sin(2x)]$ is discontinuous over the interval (0, 10) is

(0, 10) অন্তৰালত ফলনটো $[\sin(x)]+[\sin(2x)]$ বিচ্ছিন্ন হোৱা বিন্দুৰ সংখ্যা হ'ল

[A] 11

[B] 10

[C] 9

[D] 8

76. Let $f(x)$ be a differentiable function satisfying $f(-x)=f(x)$, $\forall x$. Then $f'(0)$ must be equal to

ধৰা হ'ল $f(x)$ এটা অৱকলনীয় ফলন যাতে $f(-x)=f(x)$, $\forall x$. তেন্তে $f'(0)$ ৰ মান হ'ব

[A] 0

[B] 1

[C] −1

[D] 2

$-f'(-x) = f'(x)$

77. If $\theta+\phi=\beta, \left(0<\beta<\frac{\pi}{2}\right)$, then maximum value of $\sin^2\theta+\sin^2\phi$ must be

যদি $\theta+\phi=\beta, \left(0<\beta<\frac{\pi}{2}\right)$, তেন্তে $\sin^2\theta+\sin^2\phi$ ৰ গৰিষ্ঠ মান হ'ব

[A] $2\sin^2\frac{\beta}{2}$

[B] $2\cos^2\frac{\beta}{2}$

[C] 2

[D] $2\sin^2\alpha$

78. If $A+B+C=\pi$ and maximum value of $\cos A+\cos B+k\cos C$ is $\frac{1}{\lambda k}+k$, then λ must be

যদি $A+B+C=\pi$ আৰু $\cos A+\cos B+k\cos C$ ৰ গৰিষ্ঠ মান $\frac{1}{\lambda k}+k$, তেন্তে λ ৰ মান হ'ব

[A] 1

[B] -1

[C] 2

[D] $\frac{1}{2}$

79. Let $f(x)=\int_1^x\sqrt{2-t^2}\,dt$. Then the real roots of the equation $x^2-f'(x)=0$ are

ধৰা হ'ল $f(x)=\int_1^x\sqrt{2-t^2}\,dt$. তেন্তে $x^2-f'(x)=0$ সমীকৰণৰ বাস্তৱ মূলবোৰ হ'ল

[A] ±1

[B] $\pm\frac{1}{\sqrt{2}}$

[C] $\pm\frac{1}{2}$

[D] 0, 1

80. Let $S_n=\int_0^\pi\frac{\sin(nx)}{\sin x}dx$, then S_{2007} will be equal to

ধৰা হ'ল $S_n=\int_0^\pi\frac{\sin(nx)}{\sin x}dx$, তেন্তে S_{2007} ৰ মান হ'ব

[A] 0

[B] 1

[C] π

[D] None of the above
ওপৰৰ এটাও নহয়

81. The area bounded by the equation $[y] = [x]$ in the interval $(n, n+1)$, where $n \in I$, is

$(n, n+1)$ অন্তৰালত, $[y] = [x]$ সমীকৰণৰ দ্বাৰা আবৃত ঠাইখিনিৰ কালি, $n \in I$, হ'ল

[A] 1

[B] 2

[C] $n(n+1)$

[D] None of the above
ওপৰৰ এটাও নহয়

82. $(\sin\theta, \cos\theta)$ and $(3, 2)$ lie on the same side of the line $x + y = 1$, then θ lies in

$(\sin\theta, \cos\theta)$ আৰু $(3, 2)$ বিন্দু দুটা সৰলৰেখা $x + y = 1$ ৰ একেফালে থাকিলে, θ ৰ মান থকা অন্তৰালটো হ'ব

[A] $\left(0, \frac{\pi}{2}\right)$

[B] $(0, \pi)$

[C] $\left(\frac{\pi}{4}, \frac{\pi}{2}\right)$

[D] $\left(0, \frac{\pi}{4}\right)$

83. If $a > 2b > 0$, then the positive value of m for which $y = mx - b\sqrt{1+m^2}$ is common tangent to $x^2 + y^2 = b^2$ and $(x-a)^2 + y^2 = b^2$, is

যদি $a > 2b > 0$, $x^2 + y^2 = b^2$ আৰু $(x-a)^2 + y^2 = b^2$ সাধাৰণ স্পৰ্শক $y = mx - b\sqrt{1+m^2}$ হ'লে m ৰ ধনাত্মক মান হ'ল

[A] $\frac{2b}{\sqrt{a^2 - 4b^2}}$

[B] $\frac{\sqrt{a^2 - 4b^2}}{2b}$

[C] $\frac{2b}{a - 2b}$

[D] $\frac{b}{a - 2b}$

84. The locus of a movable point $P(\alpha, \beta)$ under the condition that the line $y = \alpha x + \beta$ is a tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

ভ্ৰাম্যমান বিন্দু $P(\alpha, \beta)$ ৰ কক্ষপথ হ'ল, য'ত $y = \alpha x + \beta$, $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ পৰাবৃত্তৰ স্পৰ্শক

[A] an ellipse
এটা উপবৃত্ত

[B] a circle
এটা বৃত্ত

[C] a parabola
এটা অধিবৃত্ত

[D] a hyperbola
এটা পৰাবৃত্ত

85. Normals at three points P, Q, R on the parabola $y^2 = 4ax$ meet at (α, β). Then centroid of the triangle PQR is

$y^2 = 4ax$ অধিবৃত্তটোৰ P, Q, R বিন্দুত টনা অভিলম্বকেইডালে (α, β) বিন্দুত মিলিত হয়। তেন্তে ΔPQR ৰ ভাৰকেন্দ্ৰৰ স্থানাংক হ'ল

[A] $\left(\frac{\alpha - 2a}{3}, 0\right)$

[B] $\left(\frac{2\alpha - 4a}{3}, 0\right)$

[C] $\left(\frac{\alpha}{3}, \frac{\beta}{3}\right)$

[D] None of the above

ওপৰৰ এটাও নহয়

86. Given $A = \sin^2\theta + \cos^4\theta$, then for all real values of θ

দিয়া আছে $A = \sin^2\theta + \cos^4\theta$, θ ৰ সকলো বাস্তৱ মানৰ বাবে

[A] $1 \le A \le 2$

[B] $\frac{3}{4} \le A \le 1$

[C] $\frac{13}{16} \le A \le 1$

[D] $\frac{3}{4} \le A \le \frac{13}{16}$

87. If $\cos(x - y) = a\cos(x + y)$, then $\cot x \cot y$ is equal to

যদি $\cos(x - y) = a\cos(x + y)$, তেন্তে $\cot x \cot y$ ৰ মান হ'ব

[A] $\frac{a-1}{a+1}$

[B] $\frac{a+1}{a-1}$

[C] $a - 1$

[D] $a + 1$

88. If $\sec A - \tan A = \frac{1}{4}$, then

যদি $\sec A - \tan A = \frac{1}{4}$, তেন্তে

[A] $\sin 2A = \frac{8}{17}$

[B] $\cos A = \frac{15}{17}$

[C] $\sin A + \cos A = \frac{23}{17}$

[D] $\cos A - \sin A = \frac{7}{17}$

89. If $f_n(x) = \frac{1}{n}(\sin^n x + \cos^n x)$, then $\frac{1}{f_4(x) - f_6(x)}$ is equal to

যদি $f_n(x) = \frac{1}{n}(\sin^n x + \cos^n x)$, তেন্তে $\frac{1}{f_4(x) - f_6(x)}$ ৰ মান হ'ব

[A] 12

[B] $\frac{1}{12}$

[C] 1

[D] -12

90. If a, b, c are the sides of a triangle ABC and $3a = b + c$, then $\cot\frac{1}{2}B\cot\frac{1}{2}C$ is

ΔABC ৰ বাহুকেইটা a, b, c আৰু $3a = b + c$, তেন্তে $\cot\frac{1}{2}B\cot\frac{1}{2}C$ ৰ মান হ'ল

[A] 1

[B] $\sqrt{3}$

[C] 2

[D] $\sqrt{2}$

91. In a triangle ABC, $2ac\sin\frac{1}{2}(A - B + C) =$

ABC ত্ৰিভুজত, $2ac\sin\frac{1}{2}(A - B + C) =$

[A] $a^2 + b^2 - c^2$

[B] $c^2 + a^2 - b^2$

[C] $b^2 - c^2 - a^2$

[D] $c^2 - a^2 - b^2$

92. Let $S = \{1, 2, 3, ..., 100\}$. The number of non-empty subset A of S such that product of elements in A is even, is

ধৰা হ'ল $S = \{1, 2, 3, ..., 100\}$. A, S ৰ অৰিক্ত উপসংহতি যাৰ মৌলবোৰৰ গুণফল যুগ্ম সংখ্যা। তেন্তে তেনে A ৰ সংখ্যা হ'ল

[A] $2^{100} - 1$

[B] $2^{50} - 1$

[C] $2^{50}(2^{50} - 1)$

[D] None of the above
ওপৰৰ এটাও নহয়

93. If $\frac{1}{1!99!}+\frac{1}{3!97!}+\frac{1}{5!95!}+...+\frac{1}{99!1!}=\frac{2^k}{100!}$, then k is equal to

যদি $\frac{1}{1!99!}+\frac{1}{3!97!}+\frac{1}{5!95!}+...+\frac{1}{99!1!}=\frac{2^k}{100!}$, তেন্তে k ৰ মান হ'ব

[A] 99 [B] 97

[C] 101 [D] 96

94. If $\omega(\neq 1)$ is a cube root of unity and $(1+\omega)^7 = A+B\omega$, then A and B are respectively the numbers

যদি $\omega(\neq 1)$ এককৰ ঘনমূল আৰু $(1+\omega)^7 = A+B\omega$, তেন্তে A আৰু B ক্ৰমে

[A] 0, 1 [B] 1, 1

[C] 1, 0 [D] −1, 1

95. If $x = 1998!$, then value of the expression $\frac{1}{\log_2 x}+\frac{1}{\log_3 x}+...+\frac{1}{\log_{1998} x}$ equals

যদি $x = 1998!$, তেন্তে $\frac{1}{\log_2 x}+\frac{1}{\log_3 x}+...+\frac{1}{\log_{1998} x}$ ৰ মান হ'ব

[A] −1 [B] 0

[C] 1 [D] None of the above
ওপৰৰ এটাও নহয়

96. If the set of natural numbers is partitioned into subsets $S_1 = \{1\}$, $S_2 = \{2, 3\}$, $S_3 = \{4, 5, 6\}$ and so on, then the sum of the terms in S_{50} is

স্বাভাৱিক সংখ্যাৰ সংহতিটোক যদি তলত দিয়া উপসংহতিবিলাকত ভাগ কৰা হয়, $S_1 = \{1\}$, $S_2 = \{2, 3\}$, $S_3 = \{4, 5, 6\}$, ..., তেন্তে S_{50} উপসংহতিটোত থকা মৌলবিলাকৰ যোগফল হ'ল

[A] 62525 [B] 25625

[C] 62500 [D] None of the above
ওপৰৰ এটাও নহয়

97. The number of integral values of m, for which the x-coordinate of the point of intersection of the lines $3x+4y=9$ and $y=mx+1$ is also an integer, is

$3x+4y=9$ আৰু $y=mx+1$ সৰলৰেখা দুডালৰ ছেদবিন্দুৰ x-স্থানাংক এটা পূৰ্ণসংখ্যা হ'বলৈ mৰ কেইটা অখণ্ড মান থাকিব ?

[A] 2

[B] 0

[C] 4

[D] None of the above
ওপৰৰ এটাও নহয়

98. The area bounded by $y=e^x$, $y=e^{-x}$ and the line $x=1$ is

$y=e^x$, $y=e^{-x}$ বক্ৰদ্বয় আৰু $x=1$ সৰলৰেখাই আৱদ্ধ কৰি ৰখা কালিৰ মাপ হ'ল

[A] $e+\frac{1}{e}$

[B] $e-\frac{1}{e}$

[C] $e+\frac{1}{e}-2$

[D] $e+\frac{1}{e}+2$

99. A fair die is rolled n times. The probability of getting at least one '6' is given by

এটা অনভিনত পাশা n বাৰ নিক্ষেপ কৰা হ'ল। অন্ততঃ এটা '6' পোৱাৰ সম্ভাৱিতা হ'ল

[A] $n\left(\frac{1}{6}\right)\left(\frac{5}{6}\right)^{n-1}$

[B] $\left(\frac{5}{6}\right)^n$

[C] $1-\left(\frac{5}{6}\right)^n$

[D] $\left(\frac{1}{6}\right)^n$

100. In a class of n students, the probability that the birthdays of the students are different, is

n জন ছাত্ৰ থকা এটা শ্ৰেণীৰ প্ৰতিজন ছাত্ৰৰে জন্মদিন বেলেগ বেলেগ হোৱাৰ সম্ভাৱিতা হ'ল

[A] ${}^{365}P_n/365^n$

[B] ${}^{365}C_n/365^n$

[C] $\underline{|365}/365^n$

[D] None of the above
ওপৰৰ এটাও নহয়