١. If $ad - bc \neq ٠$ and $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $A^{٢} + xA + yI = ٠$, then

(A) $x = -(a + b)$ (B) $x = -(a + d)$

(C) $y = ad + bc$ (D) $y = bd + ac$

٢. Given $w = -\frac{١}{٢} + \frac{i\sqrt{٣}}{٢}$, then the value of $\begin{vmatrix} ١ & ١ & ١ \\ -١ - w^{٢} & w^{٢} & w^{٤} \\ ١ & w^{٢} & w^{٤} \end{vmatrix}$ is

(A) $٣w$ (B) $٣w^{٢}$

(C) $٣w(w - ١)$ (D) $٣w(١ - w)$

٣. If a, b, c are three positive real numbers, then the minimum value of the expression $\frac{b + c}{a} + \frac{c + a}{b} + \frac{a + b}{c}$ is

(A) ٠ (B) ١

(C) ٣ (D) ٦

٤. Two numbers X and Y are chosen at random (without replacement) from the set $\{١, ٢, \ldots, ٥N\}$. The probability that $X^{٢} - Y^{٢}$ is divisible by ٥ is

(A) $\frac{N - ١}{٥N - ١}$ (B) $\frac{٤(٤N - ١)}{٥(٥N - ١)}$

(C) $\frac{١٧N - ٥}{٥(٥N - ١)}$ (D) $\frac{٤N - ٥}{٥N - ١}$

٥. If $\tan\beta = \frac{n \sin\alpha \cos\alpha}{١ - n \sin^{٢}\alpha}$, then $\tan(\alpha - \beta)$ is equal to

(A) $n \tan\alpha$ (B) $(١ - n)\tan\alpha$

(C) $(١ + n)\tan\alpha$ (D) $\frac{\tan\alpha}{n}$

٦. If $\cos(\theta - \alpha)$, $\cos\theta$, $\cos(\theta + \alpha)$ are in harmonic progression, then $\cos\left(\frac{\theta}{٢}\right)\sec\theta$ is equal to

(A) $\pm\sqrt{٢}$ (B) ± ١

(C) $\pm\frac{١}{\sqrt{٢}}$ (D) $\pm\frac{\sqrt{٣}}{٢}$

٧. If in a triangle ABC, $a = ٥$, $b = ٤$ and $\cos(A - B) = \frac{٣١}{٣٢}$, then third side C is equal to

(A) ٣ (B) ٦

(C) ٧ (D) ٩

٨. If $\cos A = \frac{\sin B}{٢\sin C}$ in a triangle, then

(A) $c = a$ (B) $b = c$

(C) $٢c = a$ (D) $٢b = c$

٩. A man observes that the angle of elevation of the top of a tower from a point P on the ground is θ. He moves a certain distance towards the foot of the tower and finds that the angle of elevation of the top has doubled. He further moves a distance equal to half the previous and finds that the angle of elevation is three times that at P. Then

(A) $\sin\theta = ١/٣$ (B) $\cos\theta = ١/٣$

(C) $\cos ٢\theta = ١/٦$ (D) $\sin ٢\theta = ١/٦$

١٠. If $٢\sin^{٢}\left(\frac{\pi}{٢}\cos x\right) = ١ - \cos(\pi \sin ٢x)$, $x \neq (٢n + ١)\frac{\pi}{٢}$, $n \in I$, then $\cos ٢x$ is equal to

(A) ١/٥ (B) ٣/٥

(C) ٤/٥ (D) ١

१. µÖ×¤ü ad − bc ≠ ० †Öî¸ü A = $\begin{pmatrix} a & b \\ c & d \end{pmatrix}$ †Öî¸ü A² + xA + yI₂ = ०, ŸÖ²Ö

(A) x = −(a + b) (B) x = −(a + d)

(C) y = ad + bc (D) y = bd + ac

२. ×¤üµÖÖ Æîü w ¥Ö ½ $\frac{१}{२}(-१ + i\sqrt{३})$ ŸÖ²Ö $\begin{vmatrix} १ & १ & १ \\ १ & -१-w^२ & w^२ \\ १ & w^२ & w^४ \end{vmatrix}$ ÛúÖ ÖÖ®Ö Æîü

(A) ३w (B) ३w²

(C) ३w(w − १) (D) ३w(१ − w)

३. µÖ×¤ü a, b, c ŸÖÖß®Ö ¬Ö®ÖÖŸÖ´Ûú ¾ÖÖÃŸÖ×¾ÖÛú ÃÖÓÜµÖÖ‹Ñ Æîü, ŸÖ²Ö ¾µÖÓ•ÖÛú $\frac{b+c}{a} + \frac{c+a}{b} + \frac{a+b}{c}$ ÛúÖ ®µÖæ®ÖŸÖ´Ö ´ÖÖ®Ö Æîü

(A) ० (B) १

(C) ३ (D) ६

४. ÃÖÖê™êü ÖÖ ¤üÃÖ ‹ÛúÖ¥üÖ×¿Ö× ÛúÖ (×²Ö®ÖÖ Ö¯ÖËÎ×¸ü×ÛúÖ) ¤üÖê ÃÖÓÜµÖÖ‹Ñ x, y Æîü … ÛúÖ ÃÖÖ ¾ÖÖê³ÖÖÖ×¾Ö ÖÖ ÃÖÓ³ÖÖ¾µÖŸÖÖ Æîü

(A) $\frac{N-१}{५N-१}$ (B) $\frac{४(४N-१)}{५(५N-१)}$

(C) $\frac{१७N-५}{५(५N-१)}$ (D) $\frac{४N-५}{५N-१}$

५. µÖ×¤ü $\tan\beta = \frac{n\sin\alpha\cos\alpha}{१ - n\sin^२\alpha}$, ŸÖ²Ö tan(α − β) ÛúÖ ÖÖ®Ö Æîü

(A) n tan α (B) (१ − n) tan α

(C) (१ + n) tan α (D) $\frac{\tan\alpha}{n}$

६. µÖ×¤ü cos θ = cos α cos θ, cos(θ + α) Æ¸üüÖŸÖÖ´Ûú ÁÖêÞÖß ´Öë ÆîüÓ ŸÖ²Ö $\cos\theta \sec\frac{\alpha}{२}$ ÛúÖ ÖÖ®Ö Æîü

(A) ± $\sqrt{२}$ (B) ± १

(C) ± $\frac{१}{\sqrt{२}}$ (D) ± $\frac{\sqrt{३}}{२}$

७. µÖ×¤ü ‹Ûú ×¡Ö³ÖãÖ ABC ´Öë a = ५, b = ४ †Öî¸ü $\cos(A - B) = \frac{३१}{३२}$, ŸÖ²Ö ŸÖßÃÖ¸üß ³ÖãÖÖ c ÛúÖ ´ÖÖ®Ö Æîü

(A) ३ (B) ६

(C) ७ (D) ९

८. µÖ×¤ü ‹Ûú ×¡Ö³ÖãÖ ´Öë $\cos A = \frac{\sin B}{२\sin C}$ Æîü, ŸÖ²Ö

(A) c = a (B) b = c

(C) २c = a (D) २b = c

९. ¬ÖüŸÖ¸üÖß Ûúê ‹Ûú ×²Ö®¤üã P ÃÖê êÖ´ß®ÖÖ¸ü Ûúê ¿ÖßÂÖ ÛúÖ ˆ®®ÖµÖ®Ö ÛúÖêÞÖ θ Æîü … ×²Ö®¤üã P ÃÖê ´Öß®ÖÖ¸ü Ûúß †Öê¸ü ... ¸ü¿Ö ×²Ö®¤üã ... ®ÖÖ¸ü ... ¾Ö ÖÖÛúÖ ... ×³ÖÖÃÖ ... †Öî¸ü ¿ÖßÂÖ ÛúÖ ... ˆ®®ÖµÖ®Ö ÛúÖêÞÖ ... Æîü, ŸÖ²Ö

(A) sin θ = १/२

(B) cos θ = १/√२

(C) cos २θ = ...

(D) sin २θ = १/२

१०. µÖ×¤ü $२\sin^२\left(\frac{\pi}{२}\cos^२ x\right) = १ - \cos(\pi \sin २x)$, $x \neq (२n + १)\frac{\pi}{२}$, n ∈ I, ŸÖ²Ö cos २x ÛúÖ ÖÖ®Ö Æîü

(A) १/५ (B) ३/५

(C) ४/५ (D) १

١١. If $u = \cot^{-١}\sqrt{\cos\alpha} - \tan^{-١}\sqrt{\cos\alpha}$، then $\sin u$ is equal to

(A) $\tan^{٢}\frac{\alpha}{٢}$ (B) $\cot^{٢}\frac{\alpha}{٢}$

(C) $\tan^{٢}\alpha$ (D) $\cot^{٢}\alpha$

١٢. Which of the following is not an integral solution of the equation $\tan^{-١}x + \tan^{-١}\left(\frac{١}{y}\right) = \tan^{-١}٣$؟

(A) (١، ٢) (B) (٥، −٨)

(C) (٨، −٥) (D) (−٢، ١)

١٣. If algebraic sum of distances of a variable line from points (٢، ٠)، (٠، ٢) and (−٢، −٢) is zero، then the line passes through the fixed point

(A) (−١، −١) (B) (٠، ٠)

(C) (١، ١) (D) (٢، ٢)

١٤. Given a، b are real numbers between ٠ and ١. The vertices of a triangle are A(a، ١)، B(١، b) and C(٠، ٠). If the triangle is equilateral، then its area is equal to

(A) $\frac{٧\sqrt{٣}+١٢}{٤}$ (B) $\frac{٧\sqrt{٣}-١٢}{٤}$

(C) $\frac{\sqrt{٣}}{٤}$ (D) $\frac{٤}{\sqrt{٣}}$

١٥. The lines $٢x - ٣y = ٥$ and $٣x - ٤y = ٧$ are the diameters of a circle of area $\frac{١٥٤}{٧}\pi$ square units. An equation of this circle is

(A) $x^{٢}+y^{٢}+٢x-٢y=٦٢$

(B) $x^{٢}+y^{٢}+٢x-٢y=٤٧$

(C) $x^{٢}+y^{٢}-٢x+٢y=٤٧$

(D) $x^{٢}+y^{٢}-٢x+٢y=٦٢$

١٦. If four distinct points (٢، ٣)، (٠، ٢)، (٤، ٥) and (٠، t) are concyclic، then $(t + ١٧)^{٢}$ is equal to

(A) ٤٩١٣ (B) ٤٩٣٠

(C) ٤٩٤٧ (D) ٤٩٦٤

١٧. The equation of parabola is $y^{٢} = ٨x$ and ellipse is $\frac{x^{٢}}{٤} + \frac{y^{٢}}{٥} = ١$. The equation of a tangent common to both the parabola and the ellipse is

(A) $x + ٢y - ٨ = ٠$ (B) $x + ٢y + ٨ = ٠$

(C) $٢x + ٣y + ٨ = ٠$ (D) $٢x - ٣y + ٨ = ٠$

١٨. A normal to the parabola $y^{٢} = ٤ax$ with slope m touches the rectangular hyperbola $x^{٢} - y^{٢} = a^{٢}$، if

(A) $m^{٦} + ٤m^{٤} - ٣m^{٢} + ١ = ٠$

(B) $m^{٦} - ٤m^{٤} + ٣m^{٢} - ١ = ٠$

(C) $m^{٦} + ٤m^{٤} + ٣m^{٢} + ١ = ٠$

(D) $m^{٦} - ٤m^{٤} - ٣m^{٢} + ١ = ٠$

١٩. The reflection of the point P(١، ٠، ٠) in the line $\frac{x-١}{٢} = \frac{y+١}{-٣} = \frac{z+١٠}{٨}$ is

(A) (٣، −٤، −٢) (B) (٥، −٨، −٤)

(C) (١، −١، −١٠) (D) (٢، −٣، ٨)

٢٠. The volume of the tetrahedron included between the plane $٣x + ٤y - ٥z - ٦٠ = ٠$ and the coordinate planes in cubic units is

(A) ٦٠ (B) ١٢٠

(C) ٤٨٠ (D) ٦٠٠

٢١. The lines $\frac{x-٢}{١} = \frac{y-٣}{١} = \frac{z-٤}{-k}$ and $\frac{x-١}{k} = \frac{y-٤}{٢} = \frac{z-٥}{١}$ are coplanar if

(A) k = ١، ٢ (B) k = ٢، −١

(C) k = ٣، ١ (D) k = −٣، ٠

১১. µÖ×¤ü $\cot^{-1}\sqrt{\cos\alpha} - \tan^{-1}\sqrt{\cos\alpha}$ ŸÖ²Ö sin u ÛúÖ Ö´Ö®Ö ÆüÎ

(A) $\tan\frac{\alpha}{2}$ (B) $\cot\frac{\alpha}{2}$

(C) $\tan\alpha$ (D) $\cot\alpha$

১২. ×®Ö®´Ö×[illegible]Ö®ÖÛ¸úüÞÖ $\tan^{-1}x + \tan^{-1}\frac{1}{y} = \tan^{-1}3$ ÛúÖ Ö¯æÞÖÖÕÛú¸ÆüÞÖ ®ÖÆüà ÆüÎ

(A) (১, ২) (B) (৫, −৮)

(C) (৮, −৫) (D) (−২, ১)

১৩. µÖ×¤ü ‹Ûú "Ö¸ü üê¸ÜÖÖ ÛúßÞ ×²Ö®¤üã†ÖÖë‡Ö¸ÎÜ (–2, –2) ÃÖ ê¤üæ×¸üµÖÖ ëÛúÖ ŸÖ×ÞÖŸÖ®µÖ ÜÖêŸÖ ¿ÖÖÖÛ¸úüŸÖÖ ÆüÎ, µÖ×¤ü ‡ÃÖ ×Ã£Ö¸ü ×²Ö®¤üã ÃÖ êüê¸ÜÖÖ ŸÖã•ÖüŸÖß ÆüÎ

(A) (−১, −১) (B) (০, ০)

(C) (১, ১) (D) (২, ২)

১৪. ×¤ü[illegible]Ö¾ÖÖÃŸÖ×¾ÖÛú ÃÖÓÜµÖÖ‹ Ñ0 ‹¾Ö Ó1 ÛúÊ ²Öß"Ö ÆüÏ … ‹Ûú ×¡Ö³Öã•Ö ÛúÊ ¿ÖßÂÖ ÔA(a, 1), B(1, b) ‹¾Ö Ó ÆüÏ … µÖ×¤ü ×¡Ö³Öã•Ö ÃÖÖ´×¡Ö²ÖÖÆüÞÖ®ÆüÎ ŸÖ²Ö ×¤ü®¤üã ÛúÖ üê¸ÜÖÖ ÕÖê¡Ö±ú»Ö ÆüÎ

(A) $\frac{7\sqrt{3}+12}{4}$ (B) $\frac{7\sqrt{3}-12}{4}$

(C) $\frac{\sqrt{3}}{4}$ (D) $\frac{4}{\sqrt{3}}$

১৫. üê¸ÜÖÖ‹ Ñ2 – 3y = 5 [illegible] ÛúÊ ¾µÖÖÃÖ ÆüÏ, ¾Ö[illegible] ‡ÃÖ ¾Öé¢Ö ÛúÖ ÃÖÖ´ßÛ¸úüÞÖ ÆüÎ

(A) $x^2 + y^2 + 2x - 2y = 62$

(B) $x^2 + y^2 + 2x - 2y = 47$

(C) $x^2 + y^2 - 2x + 2y = 47$

(D) $x^2 + y^2 - 2x + 2y = 62$

১৬. µÖ×¤ü "ÖÖ¸ü×¾Ö×³Ö®®Ö ×²Ö®¤üã †Ö¸ü ÃÖÖ´"ÖÛúÊ µÖ[illegible] ÆüÎ

(A) ৪৯১৩ (B) ৪৯৩০

(C) ৪৯৪৭ (D) ৪৯৬৪

১৭. ‹Ûú Ö¯ü¾¸Ö»ÖµÖ ÛúÖ ÃÖÖ´ßÛ¸úüÞÖ ¤üß'ÖÔ¾Öé¢Ö ÛúÖ ÃÖÖ´ßÛ¸úüÞÖ ÆüÎ Ö¯ü¾¸Ö»ÖµÖ ‹¾Ö Ó¤üß'ÖÔ¾Öé¢Ö Ö¯ü¾¸Ö»ÖµÖ ‹¾Ö Ó¤üß'ÖÔ¾Öé¢Ö ÛúÖ ÃÖÖ´ßÛ¸úüÞÖ ÆüÎ

(A) $x + 2y - 8 = 0$ (B) $x + 2y + 8 = 0$

(C) $2x + 3y + 8 = 0$ (D) $2x - 3y + 8 = 0$

১৮. Ö¯ü¾¸Ö»ÖµÖ¸ü †×³Ö»Ö²´Ö¸ü ×•ÖÃÖÛúÖ[illegible] ÆüÏ ‹¸ü †ÖµÖŸÖÖÛúÖ¸ü †×ŸÖÖ¯ü¾[illegible] ÛúÖ êÃÖ¿Ö¿ÖÖÛ¸úüŸÖÖ ÆüÏ, µÖ×¤ü

(A) $m^4 + 4m^3 - 3m^2 + 1 = 0$

(B) $m^6 - 4m^4 + 3m^2 - 1 = 0$

(C) $m^6 + 4m^4 + 3m^2 + 1 = 0$

(D) $m^6 - 4m^4 - 3m^2 + 1 = 0$

১৯. µÖ×¤ü "Ö¾ÖÖ¸ü †ÖÃÖ¾Ö®ÖÛúÖ ×²Ö®¤üã ÛúÖ üê¸ÜÖÖ $\frac{x-1}{2} = \frac{y+1}{-3} = \frac{z+10}{8}$ ÖÖ¯ü¾¸Ö¾ÖŸÖÖÔ®Ö ×²Ö®¤

(A) (৩, −৪, −২) (B) (৫, −৮, −৪)

(C) (১, −১, −১০) (D) (২, −৩, ৮)

২০. ŸÖ»Ö 3 + 4y – 5z – 60 = 0 ‹¾Ö Ó×®Ö¤ ÃÖ ê²Ö®ÖÊ "ÖŸÖãÂ±ú»ÖÛú ÛúÖ †Ö[illegible]

(A) ৬০ (B) ১২০

(C) ৪৮০ (D) ৬০০

২১. üê¸ÜÖÖ‹ Ñ $\frac{x-2}{1} = \frac{y-3}{1} = \frac{z-4}{-k}$ †Ö¸ü $\frac{x-1}{k} = \frac{y-4}{2} = \frac{z-5}{1}$ ÃÖÖ´ŸÖ»ÖßµÖ ÆüÏ, µÖ

(A) k = ১, ২ (B) k = ২, −১

(C) k = ৩, ১ (D) k = −৩, ০

٢٢. The position vector of a point P is $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, where $x, y, z \in N$ and $\vec{u} = \hat{i} + \hat{j} + \hat{k}$. If $\vec{r} \cdot \vec{u} = 10$, then total number of possible positions of P are

(A) ٧٢ (B) ٣٦

(C) ٦٠ (D) ١٠٨

٢٣. The vectors $\vec{AB} = 3\hat{i} - 2\hat{j} + 2\hat{k}$ and $\vec{BC} = -\hat{i} - 2\hat{k}$ are the adjacent sides of a parallelogram. The angle between its diagonals is

(A) ٣٠° (B) ٤٥° (C) ٦٠° (D) ٧٥°

٢٤. If $\vec{A} = (1, 1, 1)$ and $\vec{C} = (0, 1, -1)$ are given vectors and $\vec{B}$ is a vector satisfying $\vec{A} \times \vec{B} = \vec{C}$ and $\vec{A} \cdot \vec{B} = 3$, then $9|\vec{B}|^2$ is equal to

(A) ١١ (B) ٢٢ (C) ٣٣ (D) ٤٤

٢٥. If in a right angle triangle ACB, the hypotenuse $AB = p$, then $\vec{AB} \cdot \vec{AC} + \vec{BC} \cdot \vec{BA} + \vec{CA} \cdot \vec{CB}$ is equal to

(A) p^2 (B) $\frac{p^2}{2}$ (C) $2p^2$ (D) $3p^2$

٢٦. The period of the function $y = \sin\frac{2t+3}{6\pi}$ is

(A) 2π (B) π (C) 6π (D) 6π

٢٧. The inverse of the function $y = \frac{10^x - 10^{-x}}{10^x + 10^{-x}}$ is

(A) $\log_{10}(2-x)$ (B) $\frac{1}{2}\log_{10}\frac{1+x}{1-x}$

(C) $\frac{1}{2}\log_{10}(2x-1)$ (D) $\frac{1}{4}\log\frac{2x}{2-x}$

٢٨. The domain of $y = \sin^{-1}\frac{x-3}{2} - \log_{10}(4-x)$ is (A) $(-\infty, 4)$

(C) $(-\infty, 3)$ (B) $(1, 4)$

(D) $(3, \infty)$

٢٩. $\lim_{x \to -1^+} \frac{\sqrt{\pi} - \sqrt{\cos^{-1}x}}{\sqrt{(x+1)}}$ is equal to

(A) $\frac{1}{\sqrt{2}}$ (B) $\frac{1}{\sqrt{\pi}}$

(C) $\frac{1}{\sqrt{2\pi}}$ (D) $\frac{1}{2\sqrt{\pi}}$

٣٠. If $f(x) = \cot^{-1}\left[\frac{x - x^{-x}}{2}\right]$, then $f'(1)$ is equal to

(A) -1 (B) 1

(C) $\log 2$ (D) $-\log 2$

٣١. The curve $y = ax^2 + bx + cx + 8$ touches x-axis at $P(-2, 0)$ and cuts the y-axis at a point Q where its gradient is 3. The values of a, b, c are respectively

(A) $-\frac{1}{2}, -\frac{3}{4}, 3$ (B) $3, -\frac{1}{2}, -4$

(C) $-\frac{1}{2}, -\frac{7}{4}, 2$ (D) $-\frac{1}{4}, 0, 3$

٣٢. If $I = \int \frac{dx}{\sqrt{(x-\alpha)(\beta-x)}}$, $(\beta > \alpha)$, then value of I is

(A) $\sin^{-1}\left[\frac{2x-\alpha-\beta}{\beta-\alpha}\right] + c$

(B) $\sin^{-1}\left[\frac{x+\alpha+\beta}{\beta-\alpha}\right] + c$

(C) $\sin^{-1}\left[\frac{2x+\beta-\alpha}{\alpha+\beta}\right] + c$

(D) $\cos^{-1}\left[\frac{x+\alpha+\beta}{\beta+\alpha}\right] + c$

٢٢. ‹Ûú ×ÖÖÔÖ×¤ü ÃÖ×¤ü¿Ö $\vec{r} = xi + yj + zk$ ÃÖ×¤ü¿Ö $\vec{r} \cdot \vec{u} = ١٠$، ŸÖÖ²Ö P ÛúÃÖ³´Ö¾Ö ×Ã£Ö×ŸÖ ÛúÖ ×¤ü ÃÖÓÜµÖÖ ÆüÎ

(A) ٧٢ (B) ٣٦

(C) ٦٠ (D) ١٠٨

٢٣. ÃÖ×¤ü¿Ö $\vec{AB} = i - ٢j + ٢k$ ‹¾ÖÖ $\vec{BC} = -i - ٢k$ ‹Ûú ÃÖÖ´Ö®ŸÖ ü "ÖŸÖ³ãÖãÖ•Ö ÛúÃÖÓ»ÖÝ®Ö ³ÖãÖ•ÖÖ‹ Ñ ÆüÏ ... ‡ÃÖÜüê ×¾ÖÜüÞÖÖ ÏÜüê ²ÖÃÖ ÖÜüêÞÖ ÆüÏ

(A) ٣٠° (B) ٤٥° (C) ٦٠° (D) ٧٥°

٢٤. µÖ×¤ü $\vec{A} = (١، ١)$ ‹¾ÖÖ $\vec{C} = (١، ١، -١)$ ×¤üµÖ êÆüã‹ ÃÖ×¤ü¿Ö ‹ÆüÏ ÃÖ×¤ü¿Ö ‡ÃÖ ÖÏ¯ ÛúÖ¸ü ÆüÎ ×Ûú ¾ÖÆüÙ $\vec{A} \times \vec{B} = \vec{C}$ ‹¾ÖÖ $\vec{A} \cdot \vec{B} = ٣$ ÛúÖ êÃÖÓŸÖãÂ™ü Ü¸üüŸÖÖ ÆüÏ, ŸÖÖ²Ö $|\vec{B}|^٢$ ÛúÖ Ö´Ö®Ö ÆüÎ

(A) ١١ (B) ٢٢ (C) ٣٣ (D) ٤٤

٢٥. µÖ×¤ü ‹Ûú ÃÖÖ´ÖÖ×¤ü¿Ö ×¤ü¿Ö ŸÖ²Ö $|\vec{AB}| = |\vec{AC}| + |\vec{BC}|$. $\vec{BA} \cdot \vec{CA} = \vec{CB}$ ÛúÖ Ö´Ö®Ö ÆüÎ

(A) $p^٢$ (B) $\frac{p^٢}{٢}$ (C) $٢p^٢$ (D) $٣p^٢$

٢٦. ±ú»Ö®Ö $y = \sin^{٢t+٣}$ $\frac{}{٦\pi}$ ÛúÖ †Ö¾ÖŸÖÔÛúÖ»Ö ÆüÎ

(A) ٢π (B) π (C) ٦π (D) ٦π²

٢٧. ±ú»Ö®Ö $y = \frac{١٠^x - ١٠^{-x}}{١٠^x + ١٠^{-x}}$ ÛúÖ ÖÏ¯ ×ŸÖ»ÖÖéÖ´ ÆüÎ

(A) $\log(١٠^{(٢^x - ١)})$ (B) $\frac{١}{٢}\log_{١٠}\frac{١+x}{١-x}$

(C) $\frac{١}{٢}\log_{١٠}(٢x - ١)$ (D) $\frac{١}{٤}\log\frac{٢x}{٢-x}$

$y = \sin^{-١}\frac{x-٣}{٢} - \log_{١٠}(٤ - x)$ ÛúÖ õÖê¡Ö ÆüÎ

(A) $(-\infty، ٤)$ (B) $(١، ٤)$

(C) $(-\infty، ١)$ (D) $(١، \infty)$

٢٩. $\lim_{x \to -١^+} \frac{\sqrt{\pi} - \sqrt{\cos^{-١}x}}{\sqrt{(x+١)}}$ ÛúÖ Ö´Ö®Ö ÆüÎ

(A) $\frac{١}{\sqrt{٢}}$ (B) $\frac{١}{\sqrt{\pi}}$

(C) $\frac{١}{\sqrt{2\pi}}$ (D) $\frac{١}{٢\sqrt{\pi}}$

٣٠. µÖ×¤ü $f(x) = \cot^{-١}\left(\frac{x - x^{-x}}{٢}\right)$، ŸÖ²Ö ÛúÖ Ö´Ö®Ö ÆüÎ

(A) −١ (B) ١

(C) log ٢ (D) −log ٢

٣١. ¾ÖÛúÎ٣٢ $y = ax + bx + cx + ٨$ x– †õÖ Ö¯ü P(−٢، ٠) Ö¯ü ÃÖ¯¿Ö ÔÛü¸üüŸÖß ÆüÎ ÛúÖ¸ü ÛúÖ¿Ö y-‡ÃÖõÖ ÛúÖ êÛúÖ¯ü ÛúÖ¯ü ŸÖß ÆüÎ ×•ÖÃÖÛúß ÖÏ¯¾ÖÞÖŸÖÖ 3 ÆüÎ ... a, b, c ÛúêÖ ÖŸÖ®Ö

(A) $\frac{١}{٢}$، $\frac{١}{٤}$، ٣ (B) ٢، ٣ (C) ٠، ٣ (D) $-\frac{١}{٤}$، ٠، ٣

٣٢. µÖ×¤ü $I = \int \frac{dx}{\sqrt{(x-\alpha)(\beta - x)}}$، $(\beta > \alpha)$ ŸÖ²Ö ÛúÖ Ö´Ö®Ö ÆüÎ

(A) $\sin^{-١}\left(\frac{٢x - \alpha - \beta}{\beta - \alpha}\right) + c$

(B) $\sin^{-١}\left(\frac{x + \alpha + \beta}{\beta - \alpha}\right) + c$

(C) $\sin^{-١}\left(\frac{٢x + \beta - \alpha}{\alpha + \beta}\right) + c$

(D) $\cos^{-١}\left(\frac{x + \alpha + \beta}{\beta + \alpha}\right) + c$

٣٣. If $I = \int_{-٢}^{٢} |١ - x^{٤}|\, dx$، then I is equal to

(A) ٦ (B) ٨ (C) ١٢ (D) ٢١

٣٤. The area bounded by curves $y = x^{٢}$، $y = \frac{٢}{(١ + x)^{٢}}$ in square units is

(A) π (B) $\left(\pi - \frac{٢}{3}\right)$

(C) $\left(\pi - \frac{١}{3}\right)$ (D) $\left(\pi + \frac{١}{3}\right)$

٣٥. If $f(n) = \frac{١}{n}(n + ١)(n + ٢) \ldots (n + n)^{١/n}$ then $\lim_{n \to \infty} f(n)$ equals

(A) e (B) $\frac{١}{e}$ (C) $\frac{٢}{e}$ (D) $\frac{٤}{e}$

٣٦. The degree of differential equation $y_{٢}^{٣/٢} - y_{١}^{١/٢} - ٤ = ٠$ is

(A) ٦ (B) ٤ (C) ٣ (D) ٢

٣٧. The differential equation of orthogonal trajectory of curve $ay^{٢} = x^{٣}$ is

(A) $x^{٢} + ٢y^{٢} = c^{٢}$ (B) $x^{٢} + ٣y^{٢} = c^{٢}$

(C) $٢x^{٢} + ٣y^{٢} = c^{٢}$ (D) $٢x^{٢} + ٢y^{٢} = c^{٢}$

٣٨. The solution of differential equation $(١ + x\sqrt{x + y})dx + (١ + \sqrt{x + y})y\,dy = ٠$ is

(A) $\frac{١}{٢}(x^{٢} + y)^{٢} - \frac{١}{٣}(x^{٢} + y)^{٣/٢} = c$

(B) $x - \frac{y^{٢}}{٢} + \frac{١}{٢}(x^{٢} + y)^{٣/٢} = c$

(C) $\frac{١}{٢}(x^{٢} + y)^{٢} - \frac{١}{٣}(x^{٢} + y)^{٣/٢} = c$

(D) $x - \frac{y^{٢}}{٢} - \frac{١}{٢}(x^{٢} + y)^{٣/٢} = c$

٣٩. If $f : R \to R$ be a mapping defined by $f(x) = ٣x + ٥$، then $f^{-١}(x)$ is equal to

(A) $\frac{١}{x + ٥}$ (B) $(x + ٥)^{١/٣}$

(C) $(x - ٥)^{١/٣}$ (D) $(x - ٥)^{١/٣}$

٤٠. A class has ١٧٥ students. The following data shows the number of students opting one or more subjects :

Mathematics ١٠٠، Physics ٧٠،

Chemistry ٤٠

Mathematics and Physics ٣٠

Mathematics and Chemistry ٢٨

Physics and Chemistry ١٨

How many students have opted Mathematics alone ?

(A) ٢٤ (B) ٤٨ (C) ٦٠ (D) ١٠٠

٤١. The least positive integer n، for which $n! > \left(\frac{n + ١}{٢}\right)^{n}$ holds، is

(A) ١ (B) ٢ (C) ٣ (D) ٤

٤٢. Let a and b be two integers such that $١٠a + b = ٥$ and $p(x) = x^{٢} + ax + b$. Find an integer n such that $p(١٠)\, p(١١) = p(n)$

(A) ١٠٥ (B) ١١٠

(C) ١١٥ (D) ١٢٠

٤٣. If $f(x) = ١ - x + x^{٢} - x^{٣} + \ldots - x^{١٥} + x^{١٦} - x^{١٧}$، then the coefficient of $x^{٣}$ in $f(x - ١)$ is

(A) ٨١٦ (B) ٨٢٢

(C) ٨٢٨ (D) ٨٤٨

٤٤. The number of solutions of $\log_{٤}(x - ١) = \log_{٢}(x - ٣)$ is

(A) ٠ (B) ١

(C) ٢ (D) ٣

٣٣. µÖ×¤ü $\int_{-2}^{2} |1 - x^4|\, dx$ ŸÖ²ÖÛúÖ Ö´Ö®Ö Æüî

(A) ٦ (B) ٨ (C) ١٢ (D) ٢١

٣٤. ¾ÖÜÛúÖë $\frac{2}{(1+x)^3}$ ÃÖ ê²Ö¬ÑÖÖ õÖêµÖ±ú»Ö Æüî,

¾ÖÝÖ ÖÖ‡ÛúÖ‡ Ô

(A) π (B) $\pi - \frac{2}{3}$

(C) $\pi - \frac{1}{3}$ (D) $\pi + \frac{1}{3}$

٣٥. µÖ×¤ü $f(n) = (n+1)(n+2)\ldots(n+n)^{1/n}$

ŸÖ²Ö $\lim_{n\to\infty} f(n)$ ÛúÖ Ö´Ö®Ö Æüî

(A) e (B) $\frac{1}{e}$ (C) $\frac{2}{e}$ (D) $\frac{4}{e}$

٣٦. †¾ÖÛú»Ö®ÖßµÖ ÃÖÖ´ßÛ¸úÞÖ y

×üÝÖÏß Æüî

(A) ٦ (B) ٤ (C) ٣ (D) ٢

٣٧. ¾ÖÜúÎ x^3 Ûúê »Ö²´ÖÛúÖêÞÖßµÖ ÃÖÓ"ûê¤üß ÛúÖ

†¾ÖÛú»Ö®ÖßµÖ ÃÖÖ´ßÛ¸úüÞÖ Æüî

(A) $x + 2y = c^2$ (B) $x + 3y = c^2$

(C) $2x + 3y = c^2$ (D) $2x + 2y = c^2$

٣٨. †¾ÖÛú»Ö®ÖßµÖ $\int (x + \sqrt{x^2+y^2})\,dx$

$(-1 + \sqrt{x+y})y\,dy = 0$ ÛúÖ Æü»Ö Æüî

(A) $\frac{1}{2}(x^2+y)^2 - \frac{1}{3}(x^2+y)^{3/2} = c$

(B) $x - \frac{y^2}{2} + \frac{1}{2}(x^2+y)^{3/2} = c$

(C) $\frac{1}{2}(x^2+y) - \frac{1}{3}(x^2+y)^{3/2} = c$

(D) $x - \frac{y^2}{2} - \frac{1}{2}(x^2+y)^{3/2} = c$

٣٩. µÖ×¤ü f : R → R ‹ÛúÖÖÎ ×ŸÖ×"Ö¡ÖÞÖ

ÃÖ ê×¸ü³ÖÖ×ÃÖŸÖÛúÖêŸÖ®Ö Æüî, ŸÖ

(A) $\frac{1}{x+5}$ (B) $(x+5)^{1/3}$

(C) $(5-x)^{1/3}$ (D) $(x-5)^{1/3}$

٤٠. ‹ÛúÛúõÖÖ Ö ë´175 ×¾ÖªÖ£Öá Æüï …

×¾ÖªÖÙ£ÖµÖÖ ë«üÖüÖ¸ ‹Ûú µÖÖ †×-

¤ü¿ÖÖÔŸÖ êÆüï :

ŸÖ×ÞÖŸÖ 100, ³ÖÖî×ŸÖÛú ×¾Ö–ÖÖ®

ŸÖ×ÞÖŸÖ ‹¾Ö Ó³ÖÖî×ŸÖÛú ×¾Ö–ÖÖ

ŸÖ×ÞÖŸÖ ‹¾Ö Ö ×¾Ö–ÖÖ®Ö 28

³ÖÖî×ŸÖÛúÃ¾Ö µÖ®Ö ×¾Ö–ÖÖ®Ö 2

ŸÖ×ÞÖŸÖ, ³ÖÖî×ŸÖÛúÃ¾Ö µÖ®Ö ×¾Ö–ÖÖ®

×ÛúŸÖ®Ö ê×¾ÖªÖÙ£ÖµÖÖ ë®Ö êÛúê

(A) ٢٤ (B) ٤٨

(C) ٦٠ (D) ١٠٠

٤١. ¾ÖÆü ®µÖæ®ÖæÞÖ

$n! > \left(\frac{n+1}{2}\right)^n$ ÃÖÆüß Æüî, Æüî

(A) ١ (B) ٢

(C) ٣ (D) ٤

×¤ü

†Ö ¸ü

‹ÛúÖ æÞÖ

$p(10)\,p(11) = p(n)$

(A) ١٠٥ (B)

(C) ١١٥ (D) ١١٠

١٢٠

٤٣. µÖ×¤ü

, ŸÖ²Ö f(x – 1) Ö ë´x ÛúÖ ÝÖãÞÖ

(A) ٨١٦ (B) ٨٢٢

(C) ٨٢٨ (D) ٨٤٨

٤٤. $\log_4(x-1) = \log_2(x-3)$ Ûúê Æü»ÖÖ ëÛúß ÃÖ

(A) ٠ (B) ١

(C) ٢ (D) ٣

٤٥. Let α, β be the roots of $x^{٢} - ٤x + A = ٠$ and γ, δ be the roots of $x^{٢} - ٣٦x + B = ٠$. If $\alpha, \beta, \gamma, \delta$ form an increasing geometrical progression, then A and B can be respectively

(A) ١ and ٩ (B) ٤ and ٣٦

(C) ٣ and ٢٤٣ (D) ٢ and ٥٤

٤٦. The maximum and minimum values of $\frac{٢x^{٢} + ١٤x + ٩}{x^{٢} + ٢x + ٣}$ are (x is real)

(A) ٤, −٥ (B) ٣, ١

(C) ٠, $-\infty$ (D) ∞, $-\infty$

٤٧. The number of ways in which ١٠ candidates $A_{١}, A_{٢}, \ldots, A_{١٠}$ can be ranked so that $A_{١}$ is always above $A_{٢}$ is

(A) ٢٨٥٢ (B) ٣٤٥٢٧

(C) ٢٧٣٤٥٢٧ (D) $\frac{١٠!}{٢}$

٤٨. The number of ways in which ١٥ identical objects can be distributed among ٦ people, is

(A) $^{١٥}C_{٦}$ (B) $^{١٦}C_{٥}$ (C) $^{٢٠}C_{٥}$ (D) $^{٢١}C_{٦}$

٤٩. If $A = \begin{bmatrix} ١ & ٠ \\ ٠ & ١ \end{bmatrix}$ and $(A + I)^{٥٠} - ٥٠A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, then $(a + b + c + d)$ is equal to

(A) ٠ (B) α (C) ١ (D) ٢

٥٠. $\begin{bmatrix} ١ + \sin ٢x & \cos^{٢}x & ٤\sin ٢x \\ \sin ٢x & ١ + \cos^{٢}x & ٤\sin ٢x \\ \sin ٢x & \cos^{٢}x & ١ + ٤\sin ٢x \end{bmatrix}$ is equal to

(A) ٠ (B) $٢ + ٤\sin ٢x$

(C) $\sin ٢x$ (D) ٤

٥١. If the points z, −iz and ١ are collinear, then z lies on a /an

(A) straight line (B) circle

(C) ellipse (D) parabola

٥٢. If $x_{١}, x_{٢}, x_{٣}$ are the roots of $x - ١ = ٠$ and w is a complex cube root of unity, then $\frac{(w^{٢} - x_{١})(w^{٢} - x_{٢})(w - x_{٣})}{(w - x_{١})(w - x_{٢})(w - x_{٣})}$ is equal to

(A) ٠ (B) ١

(C) ٢ (D) ٤

٥٣. The locus of z satisfying the inequality $\log_{(٠.٨)}|z + ١| < \log_{(٠.٨)}|z - ١|$ is

(A) Re (z) > ٠ (B) Re (z) < ٠

(C) Im (z) > ٠ (D) Im (z) < ٠

٥٤. The value of expression $\frac{١}{\cos ٢٩٠^{\circ}} + \frac{١}{\sqrt{٣}\sin ٢٥٠^{\circ}}$ is equal to

(A) $\frac{١}{\sqrt{٣}}$ (B) $\frac{٢}{\sqrt{٣}}$

(C) $\sqrt{\ }$ (D) $\frac{٤}{\sqrt{٣}}$

٥٥. The expression $\cos^{٢}\varphi + \cos^{٢}(a + \varphi) - ٢\cos a \cos\varphi \cos(a + \varphi)$ is independent of

(A) a (B) φ

(C) both a and φ (D) neither a nor φ

٥٦. If $\tan\frac{x}{٢} = \operatorname{cosec} x - \sin x$, then $\tan^{٢}\left(\frac{x}{٢}\right)$ is equal to

(A) $٢ - \sqrt{٥}$ (B) $\sqrt{٥} - ٢$

(C) $\sqrt{٥} + ٢$ (D) $٩ - ٤\sqrt{٥}$

٤٥. ×¤üµÖ[illegible] α, β ÆüÏ †Ö¸îü
$2x - 36x + B$ Ö´æ»Ö ÛúÖ ÆüÏ … µÖ×¤ü
α, β, γ, ‹ÛÚú ¾Öé×¨üŸÖ¸ü ŸÖãÞÖÖêçÖ¸ü ŸÖ²Ö[illegible] ÖÖ[illegible] ÆüÏ êÃÖÛúŸÖ êÆüÏ

(A) ١ ‹¾ÖÓ (B) ٤ ¾Ö Ó٣٦
(C) ٣ ‹¾ÖÓ (D) ٢ ¾Ö Ó٥٤

٤٦. $\frac{2x + 14x + 9}{x^2 + 2x + 3}$ ÛúÖ †×¬ÖÛúŸÖÖ´ ‹¾Ö Ó®µÖæ®ÖŸÖÖ´ Ö¯Ö®Ö ÆüÏ
$(x$ ¾ÖÖÃŸÖ×¾ÖÛú ÆüÏ

(A) ٤، −٥ (B) ٣، ١
(C) ٠، −∞ (D) ∞، −∞

٤٧. 10 †³µÖÖ[illegible] ÛúÖ ê‹Ûú Ö¯Ó×ŒŸÖ
Ö‡ÃÖ ÖÏ¯ÛúÖ¸ü »ÖŸÖ[illegible] ×Ûú
Ö¯Æü»Ö ê†Ö‹, ‡ÃÖÛúê ŸÖüß¸ÛúêÆüÏ

(A) ٢٨٥٢ (B) ٣٤٥٢٧
(C) ٢٧٣٤٥٢٧ (D) $\frac{١٠!}{٢}$

٤٨. 15 ÃÖ¾ÖÔÃÖÖ´ ¾µÖ[illegible] Û¸úü®Ö êÛúê ŸÖüß¸ÛúÖ ëÛúß ÃÖÓÜµÖÖ ÆüÏ

(A) $^{١٥}C_{٦}$ (B) $^{١٦}C_{٥}$
(C) $^{٢٠}C_{٥}$ (D) $^{٢١}C_{٦}$

٤٩. µÖ×¤ü $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ †Ö¸îü $(A + I)^{٥٠} - ٥٠A =$ ŸÖ²Ö $(a + b + c + d)$ ÛúÖ Ö´Ö®Ö ÆüÏ

(A) ٠ (B) α
(C) ١ (D) ٢

٥٠. $\begin{bmatrix} 1 + \sin 2x & \cos^2 x & 4\sin 2x \\ \sin 2x & 1 + \cos^2 x & 4\sin 2x \\ \sin 2x & \cos^2 x & 1 + 4\sin 2x \end{bmatrix}$ ÛúÖ
Ö´Ö®Ö ÆüÏ

(A) ٠ (B) $2 + 4\sin 2x$
(C) $\sin 2x$ (D) ٤

٥١. µÖ×¤ü ×²Ö®¤üã [illegible]
Ö¯¸ü Ö¯›üÌŸÖÖ ÆüÏ
(A) [illegible]
(C) ¤üß‘ÖÔ¾ÖéÇÖ Ö¯ü¾¸Ö»ÖµÖ

٥٢. µÖ×¤ü $x - 1 = 0$ ÛúêÖ×æ»Ö ÆüÏ †Ö¸îü w
‡ÛúÖ‡ ÔÛúÖ ÃÖ×´Ö´ÁÖ ‘Ö®ÖÖ´æ»Ö
$\frac{(w_2 - x_1)(w_2 - x_2)(w_2 - x_3)}{(w - x_1)(w - x_2)(w - x_3)}$ ÛúÖ Ö´Ö®Ö ÆüÏ

(A) ٠ (B) ١
(C) ٢ (D) ٤

٥٣. †ÃÖ×[illegible] ÛúêÖ $|z + 1| < \log_{(\sqrt{2})} |z - 1|$
ÛúÖ êÃÖÓŸÖ[illegible]
(A) ¾ÖÖÃŸÖ×¾ÖÛú
(B) ¾ÖÖÃŸÖ×¾ÖÛú
(C) ÃÖ×´Ö (z) > ٠
´ÁÖ (D) (z) < ٠

٥٤. [illegible] $\frac{1}{\sqrt{3}\sin 250^\circ}$ ÛúÖ Ö´Ö®Ö ÆüÏ
ÃÖ
(A) $\frac{\sqrt{3}}{3}$ (B) $\frac{2}{\sqrt{3}}$
(C) $\sqrt{\ }$ (D) $\frac{4}{\sqrt{3}}$

٥٥. ¾µÖÖ[illegible] $\cos^2(a + \varphi) - 2\cos a \cos \varphi$
$\cos(a + \varphi)$ ‡ÃÖ Ö¯¸ü ×®Ö³Ö¸ÔÛü ®ÖÆüà Û
(A) a
(B) φ
(C) ¤ü[illegible]
(D) ®[illegible]ÆüÞ

٥٦. µÖ×¤ü $\tan\frac{x}{2} = \operatorname{cosec} x - \sin x$، ŸÖ²Ö $\tan^2\left(\frac{x}{2}\right)$ ÛúÖ
Ö´Ö®Ö ÆüÏ

(A) $2 - \sqrt{5}$
(B) $\sqrt{5} - 2$
(C) $\sqrt{5} + 2$
(D) $9 - 45\sqrt{\ }$

٥٧. If in a triangle ABC، $\cos A + ٢\cos B + \cos C = ٢$، then a، b، c are in

(A) arithmetic progression

(B) geometric progression

(C) harmonic progression

(D) none of the above progression

٥٨. If two sides of a triangle are the roots of the equation $٤٢x - (٢\sqrt{\quad} \quad ٦)x + ١ = ٠$ and the included angle is ٦٠°، then the third side is

(A) $\sqrt{٣}$ (B) $\sqrt{٣}/٢$

(C) $١/\sqrt{٣}$ (D) $٢/\sqrt{٣}$

٥٩. If $\vec{a} = i + ٢j - ٣k$، $\vec{b} = ٢i + j - k$ and $\vec{u}$ is a vector satisfying $\vec{a} \times \vec{u} = \vec{a} \times \vec{b}$ and $\vec{a} \cdot \vec{u} = ٠$، then $٢|\vec{u}|^٢$ is equal to

(A) ٣ (B) ٥

(C) ٧ (D) ٩

٦٠. The value of $|\vec{a} \times i|^٢ + |\vec{a} \times j|^٢ + |\vec{a} \times k|^٢$ if $|\vec{a}| = ١$، is

(A) Zero (B) ١

(C) ٢ (D) ٣

٦١. A unit tangent vector at t = ٢ on the curve $x = t^٢ + ٢$، $y = ٤t - ٥$، $z = ٢t^٣ - ٦t$ is

(A) $\frac{١}{\sqrt{٣}}(i + j + k)$

(B) $\frac{١}{٣}(٢i + ٢j + k)$

(C) $\frac{١}{\sqrt{٦}}(٢i + j + k)$

(D) $\frac{١}{\sqrt{٦}}(i + ٢j + k)$

٦٢. A speaks the truth in ٧٠٪ cases and B in ٨٠٪ cases. The probability that they will contradict each other in describing a single event is

(A) ٠.٥٦ (B) ٠.٤٢

(C) ٠.٤ (D) ٠.٣٨

٦٣. If ٢٠٪ of the bolts produced by a machine are defective، then determine the probability that out of ٤ bolts chosen at random less than ٢ bolts will be defective

(A) ٠.٢٠٤٨ (B) ٠.٤٠٩٦

(C) ٠.٦١٤٤ (D) ٠.٨١٩٢

٦٤. On the portion of the straight line $x + y = ٢$ which is intercepted between the axes، a square is constructed away from the origin with this portion as one of its side. If p denotes the perpendicular distance of a side of this square from the origin، then the maximum value of p is

(A) $٣\sqrt{٢}$ (B) $٢\sqrt{٣}$

(C) $\frac{٢}{\sqrt{٣}}$ (D) $\frac{٣}{\sqrt{٢}}$

٦٥. The equation $x - y = ٤$ and $x^٢ + ٤y^٢ - ٤xy = ٠$ represent the sides of a /an

(A) equilateral triangle

(B) right angled triangle

(C) isosceles triangle

(D) ordinary triangle with none of the above properties

٦٦. Which of the options will not allow the equation $ax^٢ + ٢xy + by^٢ + ٢ax + ٢by = ٠$ to represent a pair of straight lines?

(A) $a = ٠$ (B) $b = ٠$

(C) $a - b = ٢$ (D) $a + b = ٢$

٦٧. The equation of a circle of radius ٥ which lies within the circle $x^٢ + y^٢ + ١٤x + ١٠y - ٢٦ = ٠$ and touches it at the point (−١، ٣) is

(A) $x^٢ + y^٢ + ٦x + ٢y - ٨ = ٠$

(B) $x^٢ + y^٢ + ١٠x + ٢y + ١ = ٠$

(C) $x^٢ + y^٢ + ٨x + ٤y - ٤ = ٠$

(D) $x^٢ + y^٢ + ٨x + ٦y = ٠$

٥٧. µÖ×¤ü ‹Ûú ×¡Ö³Öã•Ö ABC ´Öë cos A + ٢cos B + cos C = ٢، ŸÖ²Ö Æüï

(A) ÃÖÖ´Ö®ŸÖ¸ü ÁÖêÞÖß Öë´

(B) ÝÖãÞÖÖê¢Ö¸ü ÁÖêÞÖß Öë´

(C) Æ¸üüÖŸÖ´Ûú ÁÖêÞÖß Öë´

(D) ˆ¯Ö¸üÖêŒŸÖ ´Öë ÃÖê ÛúÖê‡Ô ®ÖÆüà

٥٨. µÖ×¤ü ÃÖÖ´ÖßÛú¸üÞÖ ٢x – (١ + ٣)y + ١ = Ö ÛúÖê Ö´æ»Ö ‹Ûú ×¡Ö³Öã•Ö Ûúß ¤üüÖ ê³Öã•ÖÖ‹Ñ ÑÆüï, ŸÖ²Ö ŸÖßÃÖ¸üß ³Öã•ÖÖ Æüï

(A) $\sqrt{٣}$ (B) $\sqrt{٣}/٢$

(C) ١/$\sqrt{٣}$ (D) ٢/$\sqrt{٣}$

٥٩. µÖ×¤ü $\vec{a} = \hat{i} + ٢\hat{j} - ٣\hat{k}$، $\vec{b} = ٢\hat{i} + \hat{j} - \hat{k}$ †Ö¸îü $\vec{u}$ ‹Ûú ÃÖ×¤ü¿Ö Æüï •ÖÖê $\vec{a} \times \vec{u} = \vec{a} \times \vec{b}$ ‹¾ÖÓ $\vec{a} \cdot \vec{u} = ٠$، ŸÖÖê $|\vec{u}|^٢$ ÛúÖ ´ÖÖ®Ö Æüï

(A) ٣ (B) ٥

(C) ٧ (D) ٩

٦٠. $|\vec{a} \times \hat{i}|^٢ + |\vec{a} \times \hat{j}|^٢ + |\vec{a} \times \hat{k}|^٢$ ÛúÖ ´ÖÖ®Ö, µÖ×¤ü $|\vec{a}| = ١$، Æüï

(A) ¿Öæ®µÖ (B) ١

(C) ٢ (D) ٣

٦١. ¾ÖÛúÎ x = t٢ + ٢، y = ٤t – ٥، z = ٢t٢ – ٦t Ûúê t = 2 ¯Ö¸ü ‹Ûú ‡ÛúÖ‡Ô ôÖ¯¿ÖÔ•µÖÖ ÃÖפü¿Ö Æüï

(A) $\frac{١}{\sqrt{٣}}(\hat{i} + \hat{j} + \hat{k})$

(B) $\frac{١}{٣}(٢\hat{i} + ٢\hat{j} + \hat{k})$

(C) $\frac{١}{\sqrt{٦}}(٢\hat{i} + \hat{j} + \hat{k})$

(D) $\frac{١}{\sqrt{٦}}(\hat{i} + ٢\hat{j} + \hat{k})$

٦٢. A ÃÖÖŸµÖ 70% ¯Ö¸×¸ü×Ã£Ö×ŸÖµÖÖë ëÖ ë´ ²ÖÖê»ÖŸÖÖ ꜅Æüï †Öî¸ü B 80% ¯Ö¸×¸ü×ÃÖ×ŸÖµÖÖë ëÖ ë´ … ‹Ûú Æüß ŸÖ£µÖ ÛúÖê Ûú£Ö®Ö Ûú¸ü®Öê ´Öë ¾Öê ‹Ûú ¤æüÃÖ¸êü Ûêú ×¾Ö¹ý¨ü Æüß ÆüÖê ÃÖÛúŸÖê Æïü, ‡ÃÖÛúß ¯ÖÏÖ×µÖÛúŸÖÖ Æüï

(A) ٠.٥٦ (B) ٠.٤٢

(C) ٠.٤ (D) ٠.٣٨

٦٣. µÖ×¤ü ‹Ûú Ö´¿Öß®Ö «üÖ¸üÖ ×®Ö×´ÖÔŸÖ ²ÖÖê»™ü Ö ë´ÃÖê 20% ¤üÖÖ¯ÖæÞÖÔ ÆüÖêŸÖê Æïü, ŸÖÖê µÖÖ¥ü“”û®ÖÖ ÃÖê “Öã®Öê ÝÖ‹ 4 ²ÖÖê»™ü ´Öë ÃÖê 2 ²ÖÖê»™ü ¤üÖÖ¯ÖæÞÖÔ ÆüÖê®Öê Ûúß ¯ÖÏÖ×µÖÛúŸÖÖ Æüï

(A) ٢/٢١ (B) ١٩٢/٦٢٥ (C) ... (D) ...

٦٤. ÃÖ´ŸÖ»Ö ... ¸êüÜÖÖ ... ÛúÖ ‹Ûú ×²Ö®¤ãü ... ÛúÖê ¯Ö׸ü³ÖÖ×ÂÖŸÖ Ûú¸üŸÖê Æïü ... ³Öã•ÖÖ ... ´Öë ÃÖê ‹Ûú ... †Öî¸ü ... ÛúÖ ´ÖÖ®Ö Æüï

(A) ...

(B) ...

(C) ...

٦٥. ÃÖ´ÖßÛú¸üÞÖ x – y = ٤ ¾Ö x + y = ٢ ‡ÃÖÛúß ³Öã•ÖÖ ¤ü¿ÖÖÔŸÖÖ Æüï

(A) ‹Ûú ÃÖ´Ö×«ü²ÖÖÆãü ×¡Ö³Öã•Ö Ûúß

(B) ‹Ûú ÃÖ´ÖÛúÖêÞÖ ×¡Ö³Öã•Ö Ûúß

(C) ‹Ûú ×«ü²ÖÖÆãü ×¡Ö³Öã•Ö Ûúß

(D) ‹Ûú ÃÖÖ¬ÖÖ¸üÞÖ ×¡Ö³Öã•Ö Ûúß, ×•ÖÃÖÛúß ÛúÖê‡Ô ³Öß ³Öã•ÖÖ ÃÖ´ÖÖ®Ö ®ÖÆüà Æüï

٦٦. ÃÖ´ÖßÛú¸üÞÖ x٢ + ٤xy + ٤y٢ + ٢x + ٢y = ٠ ... ¤üÖê ÃÖ´ÖÖÓŸÖ¸ü ¸êüÜÖÖ†Öë ÛúÖê ×®Ö¹ý×¯ÖŸÖ Ûú¸üŸÖÖ Æüï, µÖ×¤ü

(A) a = ٠

(B) b = ٠

(C) a – b = ٢

(D) a + b = ٢

٦٧. ×¡Ö•µÖÖ 5 Ûúê ‹Ûú ¾Öé¢Ö ÛúÖ ÃÖ´ÖßÛú¸üÞÖ, •ÖÖê ¾Öé¢Ö x٢ + y٢ + ١٤x + ١٠y – ٢٦ = ٠ Ûúê †®ŸÖ: ×ôÖ¿ÖÔ Ûú¸üŸÖÖ Æüï †Öî¸ü ×²Ö®¤ãü (–1, 3) ...

(A) x٢ + y٢ + ٨x + ٢y – ٨ = ٠

(B) x٢ + y٢ + ٨x – ٦y + ١٢ = ٠

(C) x٢ + y٢ + ٨x + ٢y – ٣ = ٠

(D) x٢ + y٢ + ٨x + ٦y = ٠

٦٨. Tangents are drawn to the ellipse $\frac{x^{٢}}{٩}+\frac{y^{٢}}{٥}=١$ at the ends of latus rectum line. The area of quadrilateral so formed is

(A) $\frac{٢٧}{٥٥}$ (B) $\frac{٢٧}{٤}$

(C) $\frac{٢٧}{٢}$ (D) ٢٧

٦٩. The equation

$\left|\sqrt{x^{٢}+(y-١)^{٢}}-\sqrt{x^{٢}+(y+١)^{٢}}\right|=K$

will represent a hyperbola for

(A) $K\in(٠،٢)$ (B) $K\in(-٢،١)$

(C) $K\in(١،\infty)$ (D) $K\in(٠،\infty)$

٧٠. If $x+y=k$ is a normal to the parabola $y^{٢}=١٢x$، p is the length of the perpendicular from the focus of the parabola on this normal، then p is equal to

(A) ٦ (B) $\sqrt{١٨}$

(C) ٣ (D) $\sqrt{٦}$

٧١. $\lim_{x\to\frac{\pi}{٣}}\frac{٣\tan x-\tan 3x}{\cos\left(x+\frac{\pi}{6}\right)}$ is equal to

(A) $\frac{٢}{\sqrt{٣}}$ (B) ١

(C) ٢٤ (D) ٣

٧٢. The number of points at which the function $f(x)=\frac{١}{\log|x|}$ is discontinuous is

(A) ٤ (B) ٣

(C) ٢ (D) ١

٧٣. If $y=\sin^{-١}\sqrt{\frac{١-x}{١+x}}$، then $y'\left(\frac{١}{٢}\right)$ is equal to

(A) ١ (B) $\frac{١}{٢}$

(C) $-\frac{\sqrt{٢}}{٣}$ (D) $-\frac{٢\sqrt{٢}}{٣}$

٧٤. The points of contact of the vertical tangents to $x=٢-٣\sin\theta$، $y=٣+٢\cos\theta$ are

(A) (٢، ٥)، (٢، ١) (B) (−١، ٣)، (٥، ٣)

(C) (٢، ٥)، (٥، ٣) (D) (−١، ٣)، (٢، ١)

٧٥. If $g(x)=\int_{٠}^{x}\cos t\,dt$، then $g(x+\pi)$ is equal to

(A) $g(x)\,g(\pi)$ (B) $g(x)+g(\pi)$

(C) $g(x)-g(\pi)$ (D) $g(x)/g(\pi)$

٧٦. $\int\frac{١}{x^{٦}+x^{٤}}dx$ is equal to

(A) $\frac{١}{٣٣}-\frac{١}{x}+\tan^{-١}x+c$

(B) $\frac{١}{x^{٣}}+\frac{١}{x}-\tan^{-١}x+c$

(C) $-\frac{١}{٣٣}-\frac{١}{x}+\tan^{-١}x+c$

(D) $-\frac{١}{x^{٣}}+\frac{١}{x}+\tan^{-١}x+c$

٧٧. $\int_{٠}^{\pi}\frac{x}{١+\sin x}dx$ is equal to

(A) $\frac{\pi}{٢}$ (B) π

(C) $\frac{\pi}{٢}\log ٢$ (D) $\pi\log ٢$

٧٨. The area of the closed figure bounded by the curves $y=\sqrt{x}$، $y=\sqrt{٤-٣x}$ and $y=٠$ is

(A) $\frac{٤}{٩}$ (B) $\frac{٨}{٩}$

(C) $\frac{١٦}{٩}$ (D) $\frac{٣٢}{٩}$

٦٨. ¤üß‘ÖÖ¾Ö¾ÖÖ¢ÖÛúê ®ÖÖ×³Ö»Ö²´Ö üê¸ÜÖÖÛúê ×ÃÖüÖ ê Ö¯¸ü ÃÖ¯¿ÖÖ•µÖÖ ÜÖa“Öß •ÖÖŸÖß ÆüÎ : “ÖŸÖ³ãÖãÖ•Ö ÛúÖ õÖê¡Ö±ú»Ö ÆüÎ :

(A) $\frac{٢٧}{٥٥}$ (B) $\frac{٢٧}{٤}$

(C) $\frac{٢٧}{٢}$ (D) ٢٧

٦٩. ÃÖÖ´ÖÛúê ×ÃÖüÖ ê Ö¯¸ü ÃÖ¯¿ÖÖ•µÖÖ ÜÖa“Öß •ÖÖŸÖß ÆüÎ : ‹Ûú †×ŸÖÖ¯ü¾¸Ö»ÖµÖ ‡ÃÖ ×ÃÖ×ŸÖ ÛúÖ ×»Ö‹ ¤ü¿ÖÖÖµÖêŸÖÖ

(A) $K \in (٠، ٢)$

(B) $K \in (-٢، ١)$

(C) $K \in (١، \infty)$

(D) $K \in (٠، \infty)$

٧٠. µÖ×¤ü Ö¯¸ü¾¸Ö»ÖµÖ x Ö¯¸ü †×³Ö»Ö²´Ö ÛúÖ Ö´Ö®Ö ÆüÎ ÆüÎ, Ö¯ü¾¸Ö»ÖµÖ ÛúÊ ±úÖêÛúÃÖ ÃÖ¸ê‡ÃÖ †×³Ö»Ö²´Ö Ö¸¸ü »Ö²´Ö ÛúÛúß »Ö²´ÖÖ‡ ÔÆüÎ, ŸÖ²Ö ÛúÖ Ö´Ö®Ö ÆüÎ

(A) ٦ (B) $\sqrt{١٨}$

(C) ٣ (D) $\sqrt{٦}$

٧١. $\lim_{x \to \frac{\pi}{٣}} \frac{٣\tan x - \tan ٣x}{\cos\left(x + \frac{\pi}{٦}\right)}$ ÛúÖ Ö´Ö®Ö ÆüÎ

(A) $\frac{٢}{\sqrt{٣}}$ (B) ١

(C) ٢٤ (D) ٣

٧٢. ±ú»Ö®Ö $f(x) = \log_{٢}(x)$ †×¾•Ö®Ö ×²Ö®¤üã†Ö ëÖ¯¸ü ÃÖŸÖŸÖ Ë®ÖÆüà ÆüÎ, ®ˆÖ ×²Ö®¤üã†Ö ëÛúß ÃÖÓÜµÖÖ ÆüÎ

(A) ٤ (B) ٣

(C) ٢ (D) ١

٧٣. µÖ×¤ü $y = \sin^{-١}\sqrt{\frac{١-x}{١+x}}$، ŸÖ²Ö $\frac{dy}{dx}$ ÛúÖ Ö´Ö®Ö ÆÎü ‹Ûú ²Ö®¤ü †ÖÛúé×ŸÖ ÛúÖ õÖê¡Ö±ú»Ö

(A) ١ (B) $\frac{١}{٢}$

(C) $-\frac{\sqrt{٢}}{٣}$ (D) $-\frac{٢\sqrt{٢}}{٣}$

٧٤. $x = ٢ - ٣\sin\theta$، $y = ٣ + ٢\cos\theta$ Ö¯¸ü ‰ú¬¾ÖÖ¬Ö ÃÖ¯¿ÖÖ•µÖÖ ÜÖa“Öß •ÖÖŸÖß ÆüÎ : ÃÖ¯¿Ö Ô×²Ö®¤üã

(A) $(٢، ٥)$، $(٢، ١)$

(B) $(-١، ٣)$، $(٥، ٣)$

(C) $(٢، ٥)$، $(٥، ٣)$

(D) $(-١، ٣)$، $(٢، ١)$

٧٥. µÖ×¤ü $g(x) = \int_{\pi}^{x} \cos^{٤} t\, dt$، ŸÖ²Ö $g(٢\pi)$ ÛúÖ Ö´Ö®Ö ÆüÎ

(A) $g(x)\, g(\pi)$

(B) $g(x) + g(\pi)$

(C) $g(x) - g(\pi)$

(D) $g(x) / g(\pi)$

٧٦. $\int \frac{dx}{x^{٣}(x^{٣}+١)}$ ÛúÖ Ö´Ö®Ö ÆüÎ

(A) $\frac{١}{٣٣x^{٣}} - \frac{١}{x} + \tan^{-١}x + c$

(B) $\frac{١}{٣٣x^{٣}} + \frac{١}{x} - \tan^{-١}x + c$

(C) $-\frac{١}{٣٣x^{٣}} - \frac{١}{x} + \tan^{-١}x + c$

(D) $-\frac{١}{٣٣x^{٣}} + \frac{١}{x} + \tan^{-١}x + c$

٧٧. $\int_{٠}^{\pi} \frac{x}{١+\sin x}\, dx$ ÛúÖ Ö´Ö®Ö ÆüÎ

(A) $\frac{\pi}{٢}$ (B) π

(C) $\frac{\pi}{٢}\log ٢$ (D) $\pi \log ٢$

٧٨. ¾ÖÖÛúÎ $x + y = \sqrt{٤ - ٣x}$ ‹¾ÖÖÓ ÃÖÖê¬ÑÖß ‹Ûú ²Ö®¤ü †ÖÛúé×ŸÖ ÛúÖ õÖê¡Ö±ú»Ö

(A) $\frac{٤}{٩}$ (B) $\frac{٨}{٩}$

(C) $\frac{١٦}{٩}$ (D) $\frac{٣٢}{٩}$

٧٩. ABCDE is a pentagon. Forces acting on a particle are represented in magnitude and direction by $\vec{AB}$, $\vec{BC}$, $\vec{CD}$, $٢\vec{DE}$, $\vec{AD}$ and $\vec{AE}$. Their resultant is given by

(A) $\vec{AE}$ (B) $٢\vec{AB}$

(C) $٣\vec{AE}$ (D) $٤\vec{AD}$

٨٠. A particle is acted upon by three forces P, Q and R. It can not be in equilibrium if P : Q : R =

(A) ١ : ٣ : ٥ (B) ٣ : ٥ : ٧

(C) ٥ : ٧ : ٩ (D) ٧ : ٩ : ١١

٨١. A rough inclined plane has its angle of inclination equal to ٤٥° and μ = ٠.٥. The magnitude of the least force in kg wt parallel to the plane required to move a body of ٤ kg up the plane is

(A) $٣\sqrt{٢}$ (B) $٢\sqrt{٢}$

(C) $\sqrt{٢}$ (D) $\frac{١}{\sqrt{٢}}$

٨٢. A train of length ٢٠٠ m travelling at ٣٠ m/s overtakes another of length ٣٠٠ m travelling at ٢٠ m/s. The time taken by the first train to pass the second is

(A) ٣٠ s (B) ٥٠ s

(C) ١٠ s (D) ٤٠ s

٨٣. A bullet of mass ٠.٠٠٦ kg travelling at ١٢٠ m/s penetrates deeply into a fixed target and is brought to rest in ٠.٠١ s. The distance through which it penetrates the target is

(A) ٣ cm (B) ٦ cm

(C) ٣٠ cm (D) ٦٠ cm

٨٤. The solution of differential equation $x\,dx + y\,dy = \frac{xdy - ydx}{x^{٢} + y^{٢}}$ is

(A) $\frac{١}{٢}(x^{٢} + y^{٢}) = \cot^{-١}\left(\frac{y}{x}\right) + c$

(B) $\frac{١}{٢}(x^{٢} + y^{٢}) = \sin^{-١}(xy) + c$

(C) $\frac{١}{٢}(x^{٢} + y^{٢}) = \tan^{-١}\left(\frac{y}{x}\right) + c$

(D) $\frac{١}{٢}(x^{٢} + y^{٢}) = \cos^{-١}(xy) + c$

٨٥. The order of the differential equation of all tangent lines to the parabola $y = ٢x$ is

(A) ١ (B) ٢

(C) ٣ (D) ٤

٨٦. The value of λ for which the vectors $\lambda i + ٢j + k$ and $٤i - ٩j + ٢k$ are perpendicular to each other is

(A) ٢ (B) − ٢

(C) ٤ (D) − ٤

٨٧. If n(A) = ٣, n(B) = ٦ and $A \subseteq B$, then the number of elements in (A ∪ B) is equal to

(A) ٣ (B) ٦

(C) ٩ (D) ١٨

٨٨. Given $f(x) = |x| + |x - ١|$, then

(A) f(x) is continuous at x = ٠ only

(B) f(x) is continuous at x = ١ only

(C) f(x) is continuous at both x = ٠ and x = ١

(D) f(x) is discontinuous

79. ABCDE ‹Ûú Ö¯Ó“Ö³Öã•Ö Æüî … ‹Ûú ÛúÞÖ Ö¯ü ÛúÖ¾Öü ÖãÖÛúÞÖÖ ²Ö»Ö Ö¯×¸üÖ´ÖÞÖ $\vec{AB}$, $\vec{BC}$, $\vec{CD}$ ‹¾ÖÓ Ö×¤ü¿ÖÖ Ö ë´ $2\vec{DE}$, $\vec{AD}$ ‹¾ÖÓ $\vec{AE}$ «üÖüÖ¸ ¤ü¿ÖÖÔ‹ •ÖÖŸÖ êÆüï … ‡®Ö ÛúÖ Ö¯×¸üÞÖÖÖÖ´ß ²Ö»Ö Æüî

(A) $\vec{AE}$ (B) $२\vec{AB}$

(C) $३\vec{AE}$ (D) $४\vec{AD}$

80. ‹Ûú ÛúÞÖ Ö¯ü ŸÖß®Ö ²Ö»Ö P, Q ‹¾Ö ÓR ÛúÖµÖÖÔüŸ¸Ö Æüï … µÖÆü ÛúÞÖ ÃÖÓŸÖã»Ö®Ö ´Öë Æîü ŸÖ²Ö ‹¾ÖÓ ¾Öß×ÃÖ£ÖÖ

P : Q : R = (A) १ : ३ : ५ (B) ३ : ५ : ७ (C) ५ : ७ : ९ (D) ७ : ९ : ११

81. ‹Ûú ÜÖã¸ü¤ü¸üê¸ †Ö®ÖŸÖ ŸÖ»Ö ÛúÖ †Ö®ÖŸÖ ÛúÖêÞÖ Æüî †Ö¸îü µ = 0.5. ŸÖ»Ö Ö¯ü ‹Ûú 4Ûúß ¾ÖÃŸÖ ãÛúÖ ê ‰¯Ö¸ü Ûúß †Ö¸êü ÝÖ×ŸÖ Û¸úüÖ®Ö êÛúê ×»Ö‹ ê†Ö¾Ö¿µÖÛú ®µÖæ®ÖŸÖ´Ö ²Ö»Ö ÛúÖ Ö¯×¸üÖ´ÖÞÖ kg wt ´Ö ë Æüî

(A) $३\sqrt{२}$ (B) $२\sqrt{२}$

(C) $\sqrt{२}$ (D) $\frac{१}{\sqrt{२}}$

82. »Ö²´ÖÖ ‡ Ô200 m Ûúß ‹Ûú üê¸»ÖÝÖÖ›üß 30 m/s Ûúß ÝÖ×ŸÖ ÃÖ êÝÖ×ŸÖ¿Öß»Ö Æü Öê®Öê êÖ¯ü ‹Ûú ¤üæÃÖ¸üß 300 m »Ö²´ÖÖ ‡Ô Ûúß üê¸»ÖÝÖÖ›üß, •ÖÖ ê×Ûú 20 m/s. Ûúß ÝÖ×ŸÖ ÃÖ ê ÝÖ×ŸÖ¿Öß»Ö Æüî, ÛúÖ ê Ö¯Ö¸ü Û¸úüŸÖß Æüî ŸÖÖ ê Ö¯Æü»Öß üê¸»ÖÝÖÖ›üß ÛúÖ ê ¤üæÃÖ¸üß Ûúß ê ÖÖ¸ü Û¸ü®Öê ´Öë »ÖÝÖ®Öê¾ÖÖ»ÖÖ ÃÖ´ÖµÖ Æüî

(A) ५० s (B) ३० s

(C) ५ s (D) २५ s

83. ¯üÖ¾Ö¸üÛú ÝÖÖ»Öß 0.006 kg Ûúß ‹Ûú ŸÖÖêÖ »Öß 120 m/s Ûúß ÝÖ×ŸÖ ÃÖ ê‹Ûú ×ÃÖ£Ö¸ü »ÖõµÖ ÛúÖ ê³Öê¤üŸÖß Æüî … †Ö¸îü 0.01 s ´Öë ×¾Ö¸üÖ´Ö †¾ÖÃ£ÖÖ ´Öë †ÖŸÖß Æüî … »ÖõµÖ ÛúÖ ê¾ÖÆü ‡ÃÖ ¤üæ¸üß ŸÖÛú ³Öê¤üŸÖß Æüî

(A) ३ cm (B) ६ cm

(C) ९ cm (D) १२ cm

84. †¾ÖÛú»Ö ÃÖ´ÖßÛú¸üÞÖ $\frac{xdy - ydx}{...}$ ÛúÖ ÃÖÖ´ÖÖ®µÖ Æü»Ö ÛúÖÖ Æüî

(A) $\frac{१}{२}(२x + y२) = \cot^{-१}\left(\frac{y}{x}\right) + c$

(B) $\frac{१}{२}(२x + y२) = \sin^{-१}(xy) + c$

(C) $\frac{१}{२}(२x + y२) = \tan^{-१}\left(\frac{y}{x}\right) + c$

(D) $\frac{१}{२}(२x + y२) = \cos^{-१}(xy) + c$

85. Ö¯ü¾ÖÛú»Ö»ÖµÖ y = 2x Ö¯ü ÃÖÖ³Öß ÃÖÖ¯ü¸üÛú Ûúß †¾ÖÛú»Ö ÃÖ´ÖßÛú¸üÞÖ Ûúß Ûúß ÛúÖ×ê™ü Æüî

(A) १ (B) २

(C) ३ (D) ४

86. ×¾ÖÛú ×ÃÖ ÃÖ´ÖŸÖ»Ö Ö¯ü »Ö´²Ö ÛúÖ ÃÖ×¤ü¿Ö ४i − j + λk ‹Ûú ¤üæÃÖ¸üß ÃÖ ê »Ö´²Ö¾ÖŸÖ Æüî

(A) २ (B) −२

(C) ४ (D) −४

87. µÖפü n(A) = ३, n(B) = ६ †Öî¸ü A ⊆ B, ŸÖ²Ö n(A ∪ B) ÛúÖ ´ÖÖ®Ö Æüî

(A) ३ (B) ६

(C) ९ (D) १८

88. ×¤üµÖÖ ÝÖµÖÖ Æüî f(x) = |x| + |x − १| ŸÖ²Ö

(A) f(x) Ûú x = ० Ö¯ü ÃÖŸÖŸÖ Æüî

(B) f(x) x = १ Ö¯ü ÃÖŸÖŸÖ Æüî

(C) f(x) x = ० †Öî¸ü x = १ ¤üÖê®ÖÖë Ö¯ü ÃÖŸÖŸÖ Æüî

(D) f(x) ÃÖŸÖŸÖ ®ÖÆüà Æüî …

٨٩. If $n(U) = ٧٠٠$، $n(A) = ٢٠٠$، $n(B) = ٣٠٠$ and $n(A \cap B) = ١٠٠$، then $n(A' \cap B')$ is

(A) ٦٠٠ (B) ٤٠٠

(C) ٣٠٠ (D) ٢٠٠

٩٠. If $f : A \to B$ is a bijection and $g : B \to A$ is the inverse of f، then fog is equal to

(A) I_A (B) I_B

(C) f (D) g

٩١. If $f(x) = x$ and $g(x) = |x|$ for all $x \in R$، then the function $\varphi(x)$ satisfying $|\varphi(x) - f(x)|^{٢} + |\varphi(x) - g(x)|^{٢} = ٠$ is

(A) $\varphi(x) = x$، $x \in$ ﷺ ٠، $\infty)$

(B) $\varphi(x) = x$، $x \in R$

(C) $\varphi(x) = -x$، $x \in (-\infty$، ٠ﷺ

(D) $\varphi(x) = x + |x|$، $x \in R$

٩٢. If $k < ٠$، $|z| = |w| = k$ and $\alpha = \dfrac{z - \bar{w}}{k^{٢} + zw}$، then $Re(\alpha)$ equals

(A) k (B) $\dfrac{k}{٢}$

(C) ٢k (D) ٠

٩٣. If w and $w^{٢}$ satisfy the equation $\dfrac{١}{a+x} + \dfrac{١}{b+x} + \dfrac{١}{c+x} + \dfrac{١}{d+x} = \dfrac{٢}{x}$ then value of $\dfrac{١}{a+١} + \dfrac{١}{b+١} + \dfrac{١}{c+١} + \dfrac{١}{d+١}$ is

(w is cube root of unity)

(A) ١ (B) ٢

(C) ٣ (D) ٤

٩٤. If $\alpha_٠$، $\alpha_١$، $\alpha_٢$، ... . $\alpha_{n-١}$ are n^{th} roots of unity، then value of $(١ + \alpha_٠)(١ + \alpha_١) \ldots (١ + \alpha_{n-١})$ is

(A) ٠ (B) $(-١)^{n}$

(C) ٣ (D) $١ + (-١)^{n-١}$

٩٥. If α، β، γ are such that $\alpha + \beta + \gamma = ٢$، $\alpha^{٢} + \beta^{٢} + \gamma^{٢} = ٦$، $\alpha^{٣} + \beta^{٣} + \gamma^{٣} = ٨$، then $\alpha^{٤} + \beta^{٤} + \gamma^{٤}$ is equal to

(A) ١٢ (B) ١٨

(C) ٢٤ (D) ٣٦

٩٦. If three positive real numbers a، b، c are in arithmetic progression such that abc = ٤، then the minimum possible value of b is

(A) $٢^{٣/٢}$ (B) $٢^{١/٣}$

(C) $٢^{٢/٣}$ (D) $٢^{٤/٣}$

٩٧. If $\log x^{٣} - \log ٢x = ٣\log ٣ - \log ٦$، then x is equal to

(A) ٣ (B) ٤

(C) ٦ (D) ٩

٩٨. The number of positive integral solutions of the equation $x_١ x_٢ x_٣ x_٤ x_٥ = ١٠٥٠$ is

(A) ١٨٧٥ (B) ١٧٥٠

(C) ١٦٠٠ (D) ١٢٠٠

٩٩. Let $a = \sum_{i>j} \left(\dfrac{١}{{}^{n}C_i} + n\dfrac{١}{{}^{n}C_j} \right)$ and

$b = \sum_{i>j} \left(\dfrac{i}{{}^{n}C_i} + n\dfrac{j}{{}^{n}C_j} \right)$، then

(A) $b = (n - ١)a$ (B) $b = (n + ١)a$

(C) $b = \dfrac{n}{٢}a$ (D) $b = ٢na$

١٠٠. If in the expansion of $\left(x - \dfrac{١}{x^{٢}}\right)^{n}$، $n \in N$، sum of the coefficients of x and $x^{-١}$ is zero، then value of n is

(A) ٢٠ (B) ١٥

(C) ١٠ (D) ٥

٨٩. µÖ×¤ü n(U) = ٧٠٠، n(A) = ٢٠٠، n(B) = ٣٠٠ †Ö¸ü n(A ∩ B) = ١٠٠، ŸÖ²Ö n(A' ∩ B') ÆüÎ

(A) ٦٠٠ (B) ٤٠٠

(C) ٣٠٠ (D) ٢٠٠

٩٠. µÖ×¤ü f : A → B ‹Ûú ‹ÛúÎÛúß †Ö“”ûÖ¤ü®Ö ÆüÎ †Ö¸ü g : B → A f ÛúÖ ÖÏ¯ ×ŸÖ»ÖÛúÖ´ ÆüÎ ŸÖ²Ö ÆüÎ

(A) I_A (B) I_B

(C) f (D) g

٩١. µÖ×¤ü f(x) = x †Ö¸ü g(x) = |x| ÃÖ³ÖßÖß x ∈ R ÛúÊ ×»Ö‹ … ŸÖ²Ö φ(x) = f(x) + g(x) |φ(x) – g(x)| = 0 ÛúÖ êÃÖÓŸÖãÂ™ü Ü¸úüŸÖÖ ÆüÎ

(A) φ(x) = x، x ∈ [٠، ∞)

(B) φ(x) = x، x ∈ R

(C) φ(x) = – x، x ∈ (–∞، ٠]

(D) φ(x) = x + |x|، x ∈ R

٩٢. µÖ×¤ü k < ٠، |z| = |w| = k †Ö¸ü $\alpha = \frac{z - \bar{w}}{k^2 + zw}$, ŸÖ²Ö Re(α) ÛúÖ Ö´Ö®Ö ÆüÎ

(A) k (B) $\frac{k}{٢}$

(C) ٢k (D) ٠

٩٣. µÖ×¤ü †Ö¸ü ÃÖÖ´ßÛúüÞÖ $\frac{١}{a+x} + \frac{١}{b+x} + \frac{١}{c+x} + \frac{١}{d+x} = \frac{٢}{x}$ ÛúÖ êÃÖÓŸÖãÂ™ü Ü¸úüŸÖ ê $\frac{١}{a+١} + \frac{١}{b+١} + \frac{١}{c+١} + \frac{١}{d+١}$ ÛúÖ ŸÖ²Ö (w ‡ÛúÖ‡ ÔÛúÖ ‘Ö®Ö Ö´Ö®Ö ÆüÎ)

(A) ١ (B) ٢

(C) ٣ (D) ٤

٩٤. µÖ×¤ü α0, α1, α2, ..., αn–1 ‡ÛúÖ‡ ÔÛúê n¾Ö ëÖ´æ»Ö ÆüÏ, ŸÖ²Ö (١ + α)n = (١ + α0) + (١ + α1) + (١ + α2) + ... + (١ + αn–1) Ö´Ö®Ö ÆüÎ

(A) ٣ (B) $(-١)^n$

(C) ٠ (D) $١ + (-١)^{n-١}$

٩٥. µÖ×¤ü α, β ÃÖ ÖÏ¯ ÛúÖ¸ü ÆüÏ ×ÛúÖ α٢ + β٢ + γ٢ = ٦، α٣ + β٣ + γ٣ = ٨، ŸÖ²Ö α٤ + β٤ + γ٤ ÛúÖ Ö´Ö®Ö ÆüÎ

(A) ١٢ (B) ١٨

(C) ٢٤ (D) ٣٦

٩٦. µÖ×¤ü ŸÖß®Ö ¬Ö®ÖÖŸÖ´ÛúÖ ¾ÖÖÃŸÖ ÃÖÖ´Ö®ŸÖÖ¸ü ÆüÎ ×ÛúÖ ÛúÖ ®µÖæ®ÖŸÖÖ´ ÃÖ³´Ö¾Ö Ö´Ö®Ö

(A) ٢/٣ (B) ١/٣

(C) ١ (D) ٤/٣

٩٧. µÖ×¤ü $\log_{٣} x = \log_{٣} ٢ + \log_{٣} ٣ - \log_{٣} ٦$، ŸÖ²Ö ÛúÖ Ö´Ö®Ö ÆüÎ

(A) ٣ (B) ٤

(C) ٦ (D) ٩

٩٨. ÃÖÖ´ßÜ¸úüÞÖ x٥٠ ÛúÊ ¬Ö®ÖÖŸÖ´ÛúÖ¯ æÞÖÖÕÛú Æü»ÖÖ ëÛúß ÃÖÓÜµÖÖ

(A) ١٨٧٥ (B) ١٧٥٠

(C) ١٦٠٠ (D) ١٢٠٠

٩٩. µÖÖ ÆüÎ $\sum_{i>j} \left[\frac{١}{c_i} + n \frac{١}{c_j} \right]$ †Ö¸ü $b = \sum_{i>j} \left[\frac{i}{n - c_i} + n \frac{j}{c_j} \right]$, ŸÖ²Ö ×¤ü

(A) b = (n – ١) a

(B) b = (n + ١) a

(C) $b = \frac{n}{٢} a$

(D) b = ٢na

١٠٠. µÖ×¤ü $\left[\frac{x^{٣}}{x^{٢}} \right]^{n} \in N$ ÛúÊ ÖÏ¯ ÃÖ¾ÖÖ¸ü Öë´ ÛúÊ ÝÖãÞÖÛúÖ êÜÖ¸ü µÖÖ®ÖÖÆüÖ¸ü æ®

(A) ٢٠ (B) ١٥

(C) ١٠ (D) ٥

Maths - Set 0

Q.No.	Ans
1	C
2	B
3	
4	D
5	B
6	D
7	B
8	C
9	D
10	
11	C
12	B
13	B
14	C
15	D
16	C
17	B
18	
19	B
20	
21	C
22	B
23	
24	D
25	B
26	B
27	C
28	B
29	B
30	C
31	
32	D
33	D
34	B
35	B
36	C
37	
38	D
39	B
40	B
41	C
42	
43	D
44	
45	C
46	B
47	D
48	

49	C
50	B
51	D
52	C
53	B
54	C
55	
56	B
57	C
58	
59	D
60	C
61	D
62	B
63	B
64	B
65	
66	D
67	B
68	B
69	
70	B
71	B
72	C
73	B
74	D
75	D
76	
77	
78	C
79	
80	D
81	
82	B
83	C
84	B
85	D
86	B
87	B
88	D
89	B
90	B
91	C
92	
93	
94	B
95	D
96	C
97	
98	C

99	B
100	C