MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

KARNATAKA CET 2015

Mathematics

1. A man takes a step forward with probability 0.4 and one step backward with probability 0.6 , then the probability that at the end of eleven steps he is one step away form the starting point , is

A. $.^{11}C_6 \times (0.24)^5$

B. $.^{11}C_6 \times (0.72)^6$

C. $.^{11}C_5 \times (0.48)^5$

D. $.^{11}C_5 \times (0.12)^5$

Answer: A

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2. $\int_0^{\pi/4} \log\left(\frac{\sin x + \cos x}{\cos x}\right) dx$ is equal to

A. $\frac{\pi}{2}\log 2$

B. log 3

C. $\frac{\pi}{4}\log 2$

D. $\frac{\pi}{8}\log 2$

Answer: D

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3. Area bounded by $y = x^3, y = 8$ and $x = 0$ is _____.

A. 14 sq. units

B. 6 sq. units

C. 2 sq.units

D. 12sq.units

Answer: D

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4. Let $\vec{a} = \hat{i} + 2\hat{j} + \hat{k}$, $\vec{b} = \hat{i} - \hat{j} + \hat{k}$ and $\vec{c} = \hat{i} + \hat{j} - \hat{k}$, vector in the plane of $\vec{a}$ and $\vec{b}$ whose projection on $\vec{c}$ is $\frac{1}{\sqrt{3}}$ is _____.

A. $4\hat{i} + \hat{j} - 4\hat{k}$

B. $4\hat{i} - \hat{j} + 4\hat{k}$

C. $3\hat{i} + \hat{j} - 3\hat{k}$

D. $\hat{i} + \hat{j} - 2\hat{k}$

Answer: B

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5. The mean devision from the data 3,10,10,4 ,7,10,5 is

A. 2

B. 2.57

C. 3

D. 3.75

Answer: B

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6. The probability distribution of x is

x	0	1	2	3
$P(x)$	0.2	k	k	$2k$

A. 0.3

B. 0.1

C. 0.2

D. 0.4

Answer: C

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7. If the function $g(x)$ is defined by

$$g(x) = \frac{x^{200}}{200} + \frac{x^{199}}{199} + \frac{x^{198}}{198} + ... + \frac{x^2}{2} + x + 5,$$

then $g'(0)$ = _____.

A. 200

B. 5

C. 1

D. 100

Answer: C

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8. A box contains 6 red marbles numbers from 1 through 6 and 4 white annd odd numbered .

A. $\frac{1}{5}$

B. $\frac{1}{6}$

C. 5

D. 6

Answer: A

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9. $\lim_{x \to 0} \frac{1 - \cos x}{x^2}$ is _____.

A. 3

B. $\frac{1}{3}$

C. 2

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

Answer: D

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10. $f(x) = \begin{cases} 3x - 8 & \text{if} x \leq 5 \\ 2k & \text{if} x > 5 \end{cases}$

A. $\frac{3}{7}$

B. $\frac{7}{2}$

C. $\frac{2}{7}$

D. $\frac{4}{7}$

Answer: B

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11. If $f(x) = 2x^2 \text{find} \frac{f(3.8) - f(4)}{3.8 - 4}$

A. 156

B. 0.156

C. 1.56

D. 15.6

Answer: B

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12. If x = ct and y = $\frac{c}{t}$, find $\frac{dy}{dx}$ at t = 2 .

A. 4

B. 0

C. $\frac{1}{4}$

D. $-\frac{1}{4}$

Answer: B

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13. A balloon which always remains spherical is being inflated by pumping in 10 cubic centrimeters of gas per second . Find the rate at which the radius 15 cm .

A. $\frac{1}{9\pi}$ cm/sec

B. $\frac{1}{\pi}$ cm/sec

C. $\frac{1}{90\pi}$ cm/sec

D. $\frac{1}{30\pi}$ cm/sec

Answer: C

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14. $\int \frac{\sin^2 x}{1+\cos x}$ dx is equal to

A. $x - \sin x + C$

B. $\cos x + C$

C. $x + \sin x + C$

D. $\sin x + C$

Answer: A

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15. $\int e^x \left(\frac{1+\sin x}{1+\cos x}\right) dx =$

A. $\tan\left(\frac{x}{2}\right) + C$

B. $e^x \sin x + C$

C. $e^x \tan\left(\frac{x}{2}\right) + C$

D. $e^x + C$

Answer: C

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16. If $1, \omega, \omega^2$ are three cube roots of unity, then $\left(1 - \omega + \omega^2\right)\left(1 + \omega - \omega^2\right)$ is

A. 2

B. 4

C. 1

D. 3

Answer: B

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17. If $\tan^{-1}\left(\frac{1-x}{1+x}\right) = \frac{1}{2}\tan^{-1} x, x > 0$ find x

A. 1

B. $\frac{1}{\sqrt{3}}$

C. $\sqrt{3}$

D. -1

Answer: B

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18. The system of linear equations $x + y + z = 6, x + 2y + 3z = 10$ and $x + 2y + az = b$ has no solution when _____

A. a= 3 , $b \neq 10$

B. $b = 3, a \neq 10$

C. a=2, $b \neq 3$

D. $b = 2, a = 3$

Answer: A

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19. The value of $\tan(1^\circ) + \tan(89^\circ)$ is _____.

A. $\frac{2}{\sin(2^\circ)}$

B. $\frac{1}{\sin(2^\circ)}$

C. $\frac{1}{\sin(1^\circ)}$

D. $\frac{2}{\sin(1^\circ)}$

Answer: A

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20. If $\frac{(x+1)^2}{x^3+x} = \frac{A}{x} + \frac{Bx+C}{x^2+1}$ then $\text{cosec}^{-1}\left(\frac{1}{A}\right) + \cot^{-1}\left(\frac{1}{B}\right) + \sec^{-1} C =$ _____

A. 0

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

C. $\frac{5\pi}{6}$

D. $\frac{\pi}{6}$

Answer: C

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21. The remainder obtained when $1! + 2! + 3! + \ldots. + 11!$ is divided by 12 is _____

A. 8

B. 6

C. 9

D. 7

Answer: C

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22. If $\alpha < 2\sin^{-1} x + \cos^{-1} x \leq \beta$, then

A. $\alpha = \frac{-\pi}{2}, \beta = \frac{3\pi}{2}$

B. $\alpha = 0, \beta = 2\pi$

C. $\alpha = \frac{-\pi}{2}, \beta = \frac{\pi}{2}$

D. $\alpha = 0, \beta = \pi$

Answer: D

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23. If $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ then A^2 is equal to _____

A. $\begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}$

B. $\begin{bmatrix} 0 & 1 \\ 0 & 1 \end{bmatrix}$

C. $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

D. $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

Answer: B

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24. The function $f(x) = [x]$ where $[x]$ is the greatest integer function is continous at

A. -2

B. 1.5

C. 4

D. 1

Answer: B

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25. If $y = \log\left(\frac{1-x^2}{1+x^2}\right)$, then $\frac{dy}{dx}$ is equal to _____

A. $\frac{4x^3}{1-x^4}$

B. $\frac{-4x^3}{1-x^4}$

C. $\frac{-4x}{1-x^4}$

D. $\frac{1}{1-x^4}$

Answer: C

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26. The two curves $x^3 - 3xy^2 + 2 = 0$ and $3x^2y - y^3 = 2$

A. cut at right angle

B. cut at angle $\frac{\pi}{4}$

C. touch each other

D. cut an angle $\frac{\pi}{3}$

Answer: A

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27. If x is real, the minimum value of $x^2 - 8x + 17$ is :

A. 2

B. 4

C. 1

D. 3

Answer: C

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28. $\int_{-\pi/4}^{\pi/4} \frac{dx}{1 + \cos 2x}$ is equal to

A. 1

B. 0

C. 2

D. 4

Answer: A

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29. The order of differential equation of all circles of given radius "a" is _____

A. 2

B. 3

C. 4

D. 1

Answer: A

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30. Find the general solution of the differential equation $x\frac{dy}{dx} + 2y = x^2, (x \neq 0)$

A. $y = \frac{x^2}{4} + C$

B. $y = \frac{x^4 + C}{4x^2}$

C. $y = \frac{x^2 + C}{4x^2}$

D. $y = \frac{x^4 + C}{x^2}$

Answer: B

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31. If $\sin x + \sin y = \frac{1}{2}$ and $\cos x + \cos y = 1$, then $\tan(x + y) =$

A. $-\frac{3}{4}$

B. $\frac{4}{3}$

C. $\frac{8}{3}$

D. $\frac{-8}{3}$

Answer: D

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32. If $A = \begin{bmatrix} \alpha & 2 \\ 2 & \alpha \end{bmatrix}$ and $A^3 = 27$ then $\alpha =$ _____

A. ± 2

B. $\pm \sqrt{2}$

C. ± 1

D. $\pm \sqrt{7}$

Answer: D

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33. If $P = \begin{vmatrix} x & 1 \\ 1 & x \end{vmatrix}$ and $Q = \begin{vmatrix} x & 1 & 1 \\ 1 & x & 1 \\ 1 & 1 & x \end{vmatrix}$ then $\frac{dQ}{dx}$ =

A. $1 - 3P$

B. 3P

C. $3P + 1$

D. $-3P$

Answer: B

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34. A line passes through (2,2) and is perpendicular to the line $3x + y = 3$ Its y - intercept is _____

A. $\frac{2}{3}$

B. 1

C. $\frac{1}{3}$

D. $\frac{4}{3}$

Answer: D

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35. Let $f: R \to R$ be defined by $f(x) = \frac{1}{x} \forall x \in R$, then f is _____

A. onto

B. not defined

C. one - one

D. bijective

Answer: B

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36. The solution set of the equation $\frac{x^2+6x-7}{|x+4|}<0$ is _____

A. $(-7,-4)$

B. $(-7,-4)\cup(4,1)$

C. $(-7,1)$

D. $(-7,-4)\cup(-4,1)$

Answer: D

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37. $f(x) = \frac{1}{2} - \tan\left(\frac{\pi x}{2}\right), \ -1 < x < 1$ and $g(x) = \sqrt{(3 + 4x - 4x^2)}$. Find the domain of $(f + g)$

A. $\left(\frac{-1}{2}, 1\right]$

B. $(-1, 1)$

C. $\left[\frac{-1}{2}, 1\right)$

D. $\left[\frac{-1}{2}, \frac{3}{2}\right]$

Answer: C

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38. Write the set builder form of $A = \{-1, 1\}$

A. A = {x :x is an integar }

B. A = {x:x is a root of the equation $x^2 + 1 = 0$}

C. A = { x :x is a real number }

D. A = { x:x is a root of the equation $x^2 = 1$ }

Answer: D

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39. If the operation $\oplus$ is defined by $a \oplus b = a^2 + b^2$ for all real numbers 'a' and 'b' then $(2 \oplus 3) \oplus 4$ =

A. 182

B. 185

C. 181

D. 184

Answer: B

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40. If $z = \frac{\left(\sqrt{3}+i\right)^3 (3i+4)^2}{(8+6i)^2}$, then |z| is equal to

A. 1

B. 3

C. 0

D. 2

Answer: D

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41. If α and β are the roots of $x^2 - ax + b^2 = 0$, then $\alpha^2 + \beta^2$ is equal to_____

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

B. $a^2 + b^2$

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

D. $a^2 - b^2$

Answer: C

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42. If the 2^{nd} and 5^{th} terms of a G.P are 24 and 3 respectively , then the sum of 1^{st} six terms is _____

A. $\frac{189}{5}$

B. $\frac{2}{189}$

C. $\frac{189}{2}$

D. $\frac{179}{2}$

Answer: C

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43. The middle term of expansion $\left(\frac{10}{x}+\frac{x}{10}\right)^{10}$ is

A. $.^{8}C_{5}\Big)$

B. $.^{10}C_{5}$

C. $.^{7}C_{5}$

D. $.^{9}C_{5}$

Answer: B

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44. If $\begin{vmatrix} 2a & x_1 & y_1 \\ 2b & x_2 & y_2 \\ 2c & x_3 & y_3 \end{vmatrix} = \frac{abc}{2} \neq 0$, then the area of the triangle whose vertices are $\left(\frac{x_1}{a}, \frac{y_1}{a}\right), \left(\frac{x_2}{b}, \frac{y_2}{b}\right)$ and $\left(\frac{x_3}{c}, \frac{y_3}{c}\right)$

A. $\frac{1}{8}$abc

B. $\frac{1}{8}$

C. $\frac{1}{4}$ abc

D. $\frac{1}{4}$

Answer: D

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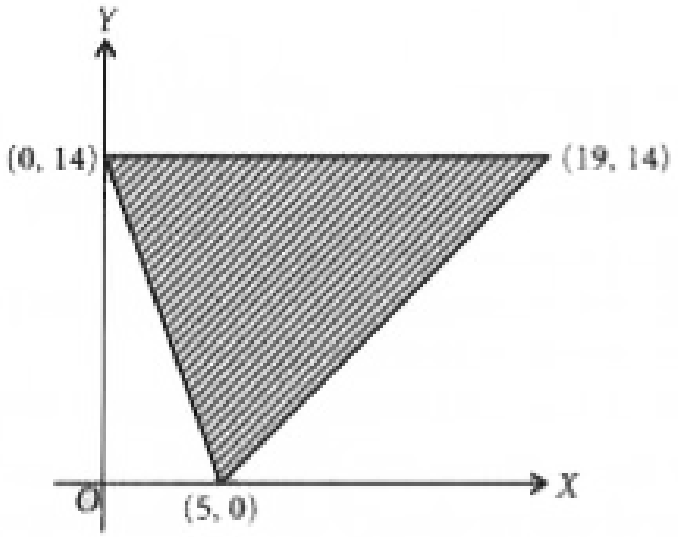
45. The shaded region shown in fig . Is given by the in equation



A. $14x + 5y \geq 70, yl14$ and $x - y \geq 5$

B. $14x + 5y \geq 70, y \geq 14$ and $x - y \geq 5$

C. $14x + 5y \geq 70, y \leq 14$ and $x - y \leq 5$

D. $14x + 5y \geq 70, y \leq 14$ and $x - y \geq 5$

Answer: C

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46. $\sim[(\sim p) \wedge q]$ is logically equivalent to

A. $p \wedge (\sim q)$

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

C. $p \vee (\sim q)$

D. $\sim[p \wedge (\sim q)]$

Answer: C

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47. The value $\sin^{-1}\left(\frac{2\sqrt{2}}{3}\right) + \sin^{-1}\left(\frac{1}{3}\right)$ is equal to

A. $\frac{\pi}{2}$

B. $\frac{2\pi}{3}$

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

D. $\frac{\pi}{4}$

Answer: A

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48. If the ecentricity of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1 is \frac{5}{4}$ and $2x + 3y - 6 = 0$ is focal chord of the hyperbola , then the length of tranverse axis is equal to _____.

A. $\frac{24}{5}$

B. $\frac{5}{24}$

C. $\frac{12}{5}$

D. $\frac{6}{5}$

Answer: A

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49. If $\vec{a} = \hat{i} + 2\hat{j} + 2\hat{k}, \left|\vec{b}\right| = 5$ and the angle between $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$, then the area of the triangle formed by these two vectors as two sides is

A. 15

B. $\frac{15\sqrt{3}}{2}$

C. $\frac{15}{2}$

D. $\frac{15}{4}$

Answer: B

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50. Let $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$. If $\vec{b}$ is a vector such that $\vec{a} . \vec{b} = \left|\vec{b}\right|^2$ and $\left|\vec{a} - \vec{b}\right|$ and $\left|\vec{a} - \vec{b}\right| = \sqrt{7}$, then $\left|\vec{b}\right|$ = _____

A. 14

B. 21

C. 7

D. $\sqrt{7}$

Answer: D

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51. If direction cosines of a vector of magnitude 3 are $\frac{2}{3}, -\frac{9}{3}, \frac{2}{3}$ and $a > 0$, then vector is _____

A. $2\hat{i} - \hat{j} + 2\hat{k}$

B. $\hat{i} + 2\hat{j} + 2\hat{k}$

C. $2\hat{i} + \hat{j} + 2\hat{k}$

D. $\hat{i} - 2\hat{j} + 2\hat{k}$

Answer:

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52. Equation of line passing through the point (2,3,1) and parallel to the line of intersection of the plane $x - 2y - z + 5 = 0$ and $x + y + 3z = 6$ is

A. $\frac{x-2}{-5} = \frac{y=3}{-4} = \frac{z-1}{3}$

B. $\frac{x-2}{4} = \frac{y-3}{3} = \frac{z-1}{2}$

C. $\frac{x-2}{4} = \frac{y-3}{-4} = \frac{z-1}{2}$

D. $\frac{x-2}{5} = \frac{y-3}{4} = \frac{z-1}{3}$

Answer: A

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53. Foot of perpendicular drawn from the origin to the plane $2x - 3y + 4z = 29$ is _____

A. $(2, -3, 4)$

B. $(5, -2, 3)$

C. $(5, -1, 4)$

D. $(7, -1, 3)$

Answer: A

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54. If two dice are thrown simultaneously , then the probability that the sum of the numbers which come up on the dice to be more than 5 is _____

A. $\frac{1}{6}$

B. $\frac{13}{18}$

C. $\frac{5}{36}$

D. $\frac{5}{18}$

Answer: B

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55. If $y = f(x^2)$ and $f'(3) = 5$ then $\frac{dy}{dx}$ at x = 1 is

_____

A. 25

B. 10

C. 5

D. 15

Answer: D

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56. If $x = a\cos^3\theta, y = a\sin^3\theta,$ then $1 + \left(\frac{dy}{dx}\right)^2$ is

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A. $\tan^2\theta$

B. 1

C. $\tan\theta$

D. $\sec^2\theta$

Answer: C

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57. Slope of normal to the curve $y = x^2 - \frac{1}{x^2}$ at $(-1, 0)$ is

A. $-\frac{1}{4}$

B. -4

C. $\frac{1}{4}$

D. 4

Answer: C

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58. $\int \frac{1}{x^2(x^4+1)^{3/4}} dx$ is equal to _____.

A. $\frac{-1\left(1+x^4\right)^{1/4}}{x^2}+C$

B. $\frac{-\left(1+x^4\right)^{3/4}}{x}+C$

C. $\frac{-\left(1+x^4\right)^{1/4}}{x}+C$

D. $\frac{-\left(1+x^4\right)^{1/4}}{2x}+C$

Answer: C

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59. If $f: R \to R$ is defined by $f(x)=\frac{x}{x^2+1}$ find $f(f(2))$.

A. $\frac{10}{29}$

B. 29

C. $\frac{1}{29}$

D. $\frac{29}{10}$

Answer: A

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60. Evaluate $\begin{vmatrix} \cos 15^\circ, \sin 15^\circ \\ \sin 75^\circ, \cos 75^\circ \end{vmatrix}$

A. 0

B. 3

C. 1

D. 2

Answer: A