MATHS

BOOKS - KCET PREVIOUS YEAR PAPERS

MODEL TEST PAPER - 1

Mathematics

1. Area enclosed in the curcves $y^2 = 4x$ and the line x = 2y is s

A. 64 sq. units

B. 64/3 sq. units

C. 8 sq.units

D. 0

Answer: B

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2. The angle between the curves $y^2 = 16x$ and $2x^2 + y^2 = 18$ at their point of intersection is

A. 0

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

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

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

Answer: D

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3. The subtangent to the curve $y^2 = \frac{x^3}{2a - x}$ at (a,a) is

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

B. a

C. 2a

D. 3a

Answer: A

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4. The subnormal at any pointion the curve $y' = a$ is constant. Then the value of x is

A. 1

B. 2

C. 3

D. 4

Answer: A

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5. The area A of a an equilateral triangle is increasing at the rate of 4 sq. cm. per second. The rate at which the sides increasing when the area is $4\sqrt{3}$ sq. cms. Is

A. $8\sqrt{3}cm/\sec$

B. $2\sqrt{3}cm/\sec$

C. $\frac{1}{\sqrt{3}}cm/\sec$

D. $\frac{2}{\sqrt{3}}cm/\sec$

Answer: D

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6. if $f(x)=\frac{1}{1-x}(x\neq 1)$, $\{f[f(x)]\}$ is

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

B. 1

C. x

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

Answer: C

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7. $f(x) = \frac{1}{1-x^2}$ and g(x) = x, the fog(x) is

A. $\cos^2\theta$

B. $\sin^2\theta$

C. $\tan\left(\frac{1}{1+x^2}\right)$

D. $\tan^2\theta$

Answer: A

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8. If : $A \rightarrow R$ is a real valued function the fomain of the function $f(x) = \sqrt{x-3} + \sqrt{2-x}$

A. $2 \leq x \leq 2$

B. $x \geq 3$

C. $x \leq 2$

D. Φ

Answer: D

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9. If : $R \rightarrow R$ defined by $f(x) = x^5 + 1$ and if fog(x) =x then g(x) is given by

A. $x^5 - 1$

B. $(x-1)^{1/5}$

C. $\left(x^5 - 1\right)^{1/5}$

D. d

Answer: B

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10. The implication $p \to q$ is false only when

A. p is true and q is false

B. p is ture and q is true

C. p is false and q is true

D. p is false and q is false

Answer: A

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11. If $\begin{bmatrix} 3 & 4 \\ -2 & 3 \end{bmatrix}\begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 11 \\ 4 \end{bmatrix}$, then the values of x, y are given respectively by

A. $x = 4, y = 11$

B. $x = 6, y = 3$

C. $x = 4, y = \; - 11$

D. $x = 1, y = 2$s

Answer: D

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12. The value of the determinant $\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix}$ is

A. $(a+b+c)_3$

B. 0

C. (1 - a) (1 -b) (1-c)

D. $a^3 + b^3 + c^3$.

Answer: B

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13. If ω is the cube root of unity then $\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix}$ is

A. 3

B. ω^2

C. $1 - \omega$

D. 0

Answer: D

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14. The inverse of the matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is

A. $\dfrac{1}{(ad-bc)}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

B. $\begin{bmatrix} d & b \\ c & a \end{bmatrix}$

C. $\dfrac{1}{(ad-bc)}\begin{bmatrix} d & b \\ c & a \end{bmatrix}$

D. $\begin{bmatrix} a & d \\ b & c \end{bmatrix}$

Answer: A

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15. Eigen values of the matrix $A = \begin{bmatrix} 3 & +2 \\ 1 & 2 \end{bmatrix}$ are

A. (3,2)

B. (-1,-4)

C. (1,4)

D. (4,-1)

Answer: C

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16. In four numbers given the first three numbers are in G.P. and the last three numbers are in A.P. with commor, difference 6. If the first and last numbers are equal then the are

A. $8, \ -4, 2, 8$

B. $9, \ -3, 1, 9$

C. $7, \ -2, 3, 7$

D. none of theses

Answer: A

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17. One of the following is perpendicular to $2\hat{i} + 2\hat{j} - \hat{k}$

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

B. $\hat{i}+\hat{j}-\frac{1}{2}\hat{k}$

C. $2\hat{i}+2\hat{j}+8\hat{k}$

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

Answer: C

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18. If $\hat{l}$ and $\widehat{m}$ are unit vectors and θ is the angle between then θ is given by

A. $\cos\theta=\left|\hat{l}-\widehat{m}\right|$

B. $\sin\frac{\theta}{2}=\frac{1}{2}\left|\hat{l}-\widehat{m}\right|$

C. $\cos\frac{\theta}{2}=\frac{1}{2}\left|\hat{l}-\widehat{m}\right|$

D. $\tan t\frac{\widehat{a}}{2}=\frac{1}{2}\left|\hat{l}-\widehat{m}\right|/\left|\hat{l}-\widehat{m}\right|$

Answer: B

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19. A particle is displaced from the point whose position vector is $5\hat{i}+\hat{j}+\hat{k}$ to the point $9\hat{i}+3\hat{j}+8\hat{k}$ under the action of constant forces difined by $9\hat{i}+5\hat{j}+\hat{k}$, $6\hat{i}-3\hat{j}-2\hat{k}$ and $7\hat{i}-8\hat{j}+3\hat{k}$. The work done by these forces is

A. 0

B. 24

C. 32

D. 92

Answer: D

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20. The magnitude of the torque about the point $3\hat{i}+2\hat{j}-2\hat{k}$ of force $\vec{F}=4\hat{j}+\hat{k}$ acting through the point $\hat{i}+\hat{j}+\hat{k}$ is

A. 23

B. $\sqrt{237}$

C. 37

D. $\sqrt{137}$

Answer: B

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21. The set z = { 1, 2, 3, 4} is an abelian group under

A. addition modulo 4

B. addition modulo 5

C. multiblication modulo 5

D. multiplication modulo 4.

Answer: C

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22. If in the standard from of the cubic $x^3 + 3Hx + G = 0$ where H and G are real we have $G^2 + 4H^3 = 0$, then

A. the equation has a pair of complex roots

B. the equation has two equal roots

C. Cardon's method fails to give the solution

D. none of the above holds

Answer: B

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23. The number of permutations of n different things not more than r and not less than or equal to $S(s < r)$ at a time when each thing may be repeated any number of times is

A. $\frac{n}{n-1}(n^r - n^s)$

B. $\frac{n}{n-1}(n^s - n^r)$

C. ${}^rC_s$

D. none of these

Answer: A

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24. If the binary oprationis defined by $a^*b = a + b - 5$ over Z., the identify element is

A. 0

B. 1

C. 4

D. 5

Answer: D

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25. The equation of the circle the two ends of its diameter are (a, 2a) and (2a, a) iss

A. $x^2 + y^2 - 3ax - 3ay + 4a^2 = 0$

B. $x^2 + y^2 - 12ax - 12ay + 114a^2 = 0$

C. $x^2 + y^2 + 13ax + 3ay - 4a^2 = 0$

D. $x^2 + y^2 - 3ax + 3ay + 4a^2 = 0$

Answer: A

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26. The equation of the circle passing thhroguh the centre of the circle C given by $x^2 + y^2 - 2x - 2y + 2 = 0$ and having its centre at (4, 5) is

A. $x^2 + y^2 + 8x + 10y - 16 = 0$

B. $x^2 + y^2 - 8x - 10y + 16 = 0$

C. $x^2+y^2+8x+10y+16=0$

D. $x^2+y^2+4x+5y+25=0$

Answer: B

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27. The value of k for which the circles $x^2-y^2+3x-7y+k=0$ and $x^2+y^2-4x+2y-14=0$ would intersect orthogonallys

A. $k=\;-2$

B. $k=\;-1$

C. $k=0$

D. $k=1$

Answer: D

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28. The radical axis of the circles $C_1 = x^2 + y^2 + 4x + 8y + 6 = 0$ and $C_2 = 2x^2 + 2y^2 + 6x + 6y - 3 = 0$ is

A. $2x - 10y + 15 = 0$

B. $2x + 10y - 15 = 0$

C. $2x + 10y + 15 = 0$

D. $2x - 10y - 15 = 0$

Answer: C

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29. The limiting points of the co-axial system determined the circle s $x^2 + y^2 + 6x - 8y - 5 = 0$ and $x^2 + y^2 + 10x - 10y - 10 = 0$ is

A. (1,2) and (3,1)

B. (-1,2) and (-3,-1)

C. (1-1,2) and (-3,1)

D. (1,-2) and (1,-3)

Answer: A

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30. The euation of the parablola with its axis parallel to x - axis and passing through (4, -6) , (7, 6) and (3,-2) is

A. $y^2 + 16x - 4y - 52 = 0$

B. $y^2 + 4y - 16x + 52 = 0$

C. $y^2 + 4y + 16x - 52 = 0$

D. $y^2 - 4y - 16x - 52 = 0$

Answer: B

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31. The co-efficients of x^2 and x^3 in the expansion of $(3+kx)^9$ are equal. Then the value of k is

A. 1

B. $9/2$

C. $9/7$

D. $5/7$

Answer: C

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32. The distance between the directrices fo an ellipse is four times the distance between their foci. Then the ecentricity fo the ellipse is

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

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

C. 1

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

Answer: D

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33. If $x+3y+k=0$ touches the ellipse $\frac{x^2}{64}+\frac{y^1}{4}=1$ then the value of k is

A. ± 4

B. ± 10

C. ± 8

D. ± 6

Answer: B

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34. The product of the perpendicular from any poitn P(x,y) on the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ to its asymptotes is

A. $\frac{a^2b^2}{a^2 + b^2}$

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

C. $\frac{zy}{\sqrt{x^2 + y^2}}$

D. $\frac{ab}{a^2 + b^2}$

Answer: A

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35. The partial fractions of $\frac{x^3 - 5}{(x-1)^3(x+2)}$ are of the from

A. $\frac{A}{(x-1)^3}\frac{B}{x+2}$

B. $\frac{A}{x-1} + \frac{B}{(x-1)^2} + \frac{C}{(x-1)^3} + \frac{D}{x+2}$

C. $\frac{Ax^2 + Bx + C}{(x-1)^3} + \frac{C}{x+2}$

D. none of these

Answer: B

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36. Which of the following in not true is $a \equiv bx$ (modm)and $x \in Z$?

A. $a + x \equiv b + x$ (mod m)

B. $ax \equiv bx$ (mod m)

C. $a - x \equiv b - c$ (mod m)

D. $a \div x \equiv b \div x$ (modm)

Answer: D

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37. $2\tan^{-}\frac{1}{3} + \tan^{-}\frac{1}{7}$ is equal to

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

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

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

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

Answer: A

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38. The equation $ax^2 + 2\sqrt{a}xy + by^2 = 0$ represents

A. pair of perpendicular lines

B. a pair of lines passing through origin

C. a pair of coincident lines

D. none of these

Answer: C

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39. $Lt_{n \to \infty} \dfrac{(1^2 + 2^2 + 3^3 + \dots + n^2)}{(1^3 + 2^3 + 3^3 + \dots + n^3)} =$

A. 0

B. 1

C. -1

D. none of these

Answer: A

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40. The general solution of $\sin x + \sin 2x + \sin 3x = 0$ is

A. $x = (2n+1)\pi \pm \dfrac{\pi}{3}$

B. $x = 2n\pi \pm \dfrac{2\pi}{3}, x = \dfrac{n\pi}{2}$

C. $x = 2n\pi \pm \dfrac{\pi}{3}$

D. $x = (2n+1) \pm \frac{\pi}{6}, x = (2n+1)\frac{\pi}{2}$

Answer: B

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41. If the bisector of the angle A of ΔABC makes an angle θ with BC, then $\sin\theta$ equals

A. $\cos\frac{B-C}{2}$

B. $\sin\frac{B-C}{2}$

C. $\sin\left(B-\frac{A}{2}\right)$

D. $\sin\left(C-\frac{A}{2}\right)$

Answer: A

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42. $(1-i)^9$ is equal to

A. (1 - i)

B. $16-16i$

C. (1 + i)

D. 16 + 16i

Answer: B

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43. $\left|\frac{1}{(3+i)^2}-\frac{1}{(3-i)^2}\right|$=

A. $\frac{1}{18}$

B. 0

C. $\frac{3}{25}$

D. $\frac{9}{625}$

Answer: C

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44. If $1, \omega, \omega^2$ are the cube roots of unity the value of $\left(1-\omega+\omega^2\right)^5+\left(1+\omega-\omega^2\right)^5$ is equal to

A. 32

B. 16

C. 64

D. 4

Answer: A

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45. Let f(x) = $\begin{cases} \frac{x^2-16}{x-4} & \text{if} \quad x \neq 4 \\ k & \text{if} \quad x = 4 \end{cases}$

The the value of k which will make f (x) continuous at x = 4 is

A. 4

B. 6

C. 8

D. 12

Answer: C

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46. Integrate $\frac{xe^x}{(1+x)^2}$ with respect to x.

A. $(x^3 - x^2 + x + 1)\frac{e^x}{(1+x^2)^2}$

B. $\frac{(x^2 + x + 1)e^x}{(1+x^2)^2}$

C. $\frac{(x^3 + x^2 - x - 1)e^x}{(1+x^2)^2}$

D. $\frac{(x^3 + 2x^2 - 3x + 1)e^x}{(1+x^2)^2}$

Answer: A

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47. If y $\sqrt{\frac{1-\cos 2x}{1+\cos 2x}}$ then $\frac{dy}{dx}=0$

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

B. $\cot^2 x$

C. $\sec^2 x$

D. $\left(\frac{1+\cos 2x}{1-\cos 2x}\right)^{3/2}$

Answer: C

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48. If $p_1 p_2, p_3$ are the lengths of altitudes of a triangle from the vertices A, B, C and Δ the area fo the triangle the $\frac{1}{p_1}+\frac{1}{p_2}-\frac{1}{p_3}$=

A. $\frac{2ab}{(a+b+c)\Delta}\cos^2\frac{A}{2}$

B. $\frac{(2ab)\cos^2 C/2}{(a+b+c)\Delta}$

C. $\frac{2ab\cos^2 B/2}{(a+b+c)\Delta}$

D. none of these

Answer: B

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49. Let y = acos(log x) + bsin (logx)`, then

A. $x^2\frac{d^2y}{dx^2}+x\frac{dy}{dx}+y=0$

B. $\frac{d^2y}{dx^2}+x\frac{dy}{dx}=y=0$

C. $x^2\frac{d^2y}{dx^2}-x\frac{dy}{dx}+y=0$

D. $x^2\frac{d^2y}{dx^2}-x\frac{dy}{dx}-xy=0$

Answer: A

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50. The equation of the tangent to the curve $y^2 = 10 - 5x$ parallelto the line $10x + 8y + 221 = 0$ is

A. $5x + 4y - 14 = 0$

B. $5x + 4y + 14 = 0$

C. $x - y + 2 = 0$

D. $4x - 5y + 14 = 0$

Answer: A

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51. The value of the integrate $\int \sqrt{\frac{1-x}{1+x}}$ is

A. $\sin^{-1} x\sqrt{1-x^2} + C$

B. $\cos^{-1} + \sqrt{1-x^2} + C$

C. $\sin^{-1} x + \log \sqrt{1-x^2} + C$

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

Answer: A

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52. $\int \sin^4 x dx =$

A. $\frac{1}{8}\left[x - \sin 2x + \frac{\sin 4x}{4}\right] + C$

B. $\frac{1}{8}\left[3x - 3\sin 2x + \sin 4\frac{x}{4}\right] + C$

C. $(\sin x - \sin 3x + \sin 4x) + C$

D. $\left[3x - 2\sin 2x + \frac{\sin 4x}{4}\right] + C$

Answer: B

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53. Find $\int x \log x dx.$

A. $\left(x \log x + \frac{1}{x}\right) + C$

B. $\frac{x^2}{2} \log x + \log x + C$

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

D. $\frac{x^2}{2}(\log x + 1) + C$

Answer: C

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54. $\int_0^{\pi/2} x \sin^2 x dx =$

A. $\frac{\pi^2}{4} + \frac{1}{16}$

B. $\frac{\pi^2}{16} + \frac{1}{4}$

C. π^2

D. 0

Answer: B

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55. $\int_{0}^{\pi/2}\frac{\sin^{7/2}x}{\left(\sin^{7/2}x+\cos^{7/2}x\right)}dx=$

A. 0

B. $\pi/4$

C. $3\pi/2$

D. 0

Answer: D

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56. If a compound proposition obtained by combining two propositions p and q is false only when both p and q are false and true in all the other cases, then the compound proposition is

A. conjuction

B. disjunction

C. implication

D. equivalence.

Answer: B

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57. Pick out the compound proposition which is a taugology.

A. $(P^{\wedge}q) \rightarrow p$

B. $p \rightarrow q$

C. $p \rightarrow q$

D. $p^{\wedge}q \rightarrow \sim p$

Answer: A

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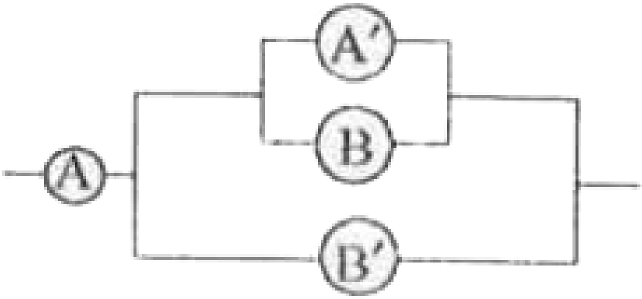
58. Write down the Boolean polynomial for the circuit



A. $A \vee \{(A'B) \wedge B\}$

B. $A \wedge \{(A'B) \vee B')$

C. $(A \vee B')\{ \vee (A \wedge B')\}$

D. $(A \wedge A')(B \wedge B')$

Answer: B

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59. If $f(x) = In(x), g(x) = x^3$ then f(g(ab)) = ...

A. $f(g(a) + gb))$

B. $f(g(ab))$

C. $g(f(ab))$

D. $g(f(a) + f(b))$

Answer: A

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60. If A = $\begin{bmatrix} \cos^3 \theta & \sin \theta \\ -\sin^3 \theta & \cos^3 \theta \end{bmatrix}$ then A^3 =

A. $\begin{bmatrix} \cos^3 \theta & \sin^3 \theta \\ -\sin^3 \theta & \cos^3 \theta \end{bmatrix}$

B. $\begin{bmatrix} \cos^2 \theta \sin \theta & \sin^2 \theta \cos \theta \\ -\sin^2 \theta \cos \theta & \cos^2 \theta \sin \theta \end{bmatrix}$

C. $\begin{bmatrix} \cos 3\theta & \sin 3\theta \\ -\sin 3\theta & \cos 3\theta \end{bmatrix}$

D. $\begin{bmatrix} \sin 3\theta & \cos 3\theta \\ -\cos 3\theta & \sin 3\theta \end{bmatrix}$

Answer: C

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