Seat No.	

Total No. of Pages : 15

M.Sc. Entrance Examination 2026
Department of Mathematics
M.Sc. Mathematics
Subject Code : 58716

Day and Date : Tuesday, 21-07-2026 **Total Marks : 100**
Time : 12:30 pm to 02.00 pm

Instructions:
1) All questions are compulsory.
2) Each question carries 1 mark.
3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
4) Follow the instructions given on OMR sheet.
5) Rough work shall be done on the sheet provided at the end of question paper.

1. First two terms in expansion of $\log(1+e^x)$ by Maclaurin's theorem is ----------
   A) $log2+\frac{x}{2}+ -----$
   B) $log2-\frac{x}{2}+ -----$
   C) $x-\frac{x^2}{2}+ ---$
   D) $x+\frac{x^2}{2}+ ---$

2. Expansion of $\frac{1}{1+x}$ in ascending powers of x is ---------
   A) $-1-x-x^2-x^3- -----$
   B) $1+\frac{x^2}{2!}+\frac{x^4}{4!}+\frac{x^6}{6!}+ ----$
   C) $1-x+x^2-x^3+ ----$
   D) $1+x+x^2+x^3+ -----$

3. Which of the following is continuous at $x=0$?
   A) $f(x)=\frac{1}{x}$
   B) $f(x)=\frac{|x|}{x}$
   C) $f(x)=|x|$
   D) $f(x)=\frac{x}{|x|}$

4. The meaning of $\frac{1}{(D+a)}X=$ -------------
   A) $e^{ax}\int Xe^{-ax}\,dx$
   B) $e^{-ax}\int Xe^{ax}\,dx$
   C) $e^{ax}\int X\,dx$
   D) $\int X\,dx$

5. The complete solution of the differential equation $(D^2 + D + 1)y = 0$ is ----------

   A) $y = e^{-\frac{x}{2}}\{c_1 \cos\left(\frac{\sqrt{3}}{2}\right)x + c_1 \sin\left(\frac{\sqrt{3}}{2}\right)x\}$

   B) $y = (c_1 + c_2 x)e^x$

   C) $y = e^{\frac{x}{2}}\{c_1 \cos\left(\frac{\sqrt{3}}{2}\right)x + c_1 \sin\left(\frac{\sqrt{3}}{2}\right)x\}$

   D) $y = (c_1 + c_2 x)e^{-x}$

6. The general solution of the differential equation $\frac{d^2y}{dx^2} + B\frac{dy}{dx} + C = 0$is -----------if it's auxiliary equation has two roots$\alpha + i\beta$ and $\alpha - i\beta$

   A) $y = c_1 \cos(\alpha x) + c_2 \sin(\alpha x)$

   B) $y = c_1 \cos(\beta x) + c_2 \sin(\beta x)$

   C) $y = e^{\beta x}[c_1 \cos(\alpha x) + c_2 \sin(\alpha x)]$

   D) $y = e^{\alpha x}[c_1 \cos(\beta x) + c_2 \sin(\beta x)]$

7. If $x = u + v, y = u - v$ then the Jacobian $\frac{\partial(x,y)}{\partial(u,v)}$ is --------

   A) $zero$

   B) one

   C) 2

   D) -2

8. If $z = \frac{x+y}{x-y}$ where $x \neq y$ then $\frac{\partial z}{\partial x} + \frac{\partial z}{\partial y} = ---$

   A) $\frac{2(x+y)}{(x-y)^2}$

   B) $\frac{2}{x-y}$

   C) $\frac{-2}{x-y}$

   D) None of these

9. Let F be a real valued function described by $f(x) = x^2 \quad (-\infty < x < \infty)$. Then $f([0,3)) = --$

   A) (0,9)

   B) (0,9]

   C) [0,9)

   D) [0,9]

10. If p is prime, which does not divide the integer a then g.c.d. of p and a = -------

    A) a

    B) p

    C) one

    D) zero

11. By suitable substitution the differential equation

$(3x+5)^2\frac{d^2y}{dx^2} - 6(3x+5)\frac{dy}{dx} + 27y = 0$ can be reduced to the homogeneous form

A) $v^2\frac{d^2y}{dv^2} + 6v\frac{dy}{dv} - 27y = 0$ B) $v^2\frac{d^2y}{dv^2} - 6v\frac{dy}{dv} + 27y = 0$

C) $v^2\frac{d^2y}{dv^2} + 2v\frac{dy}{dv} - 3y = 0$ D) $\frac{d^2y}{dv^2} - 2\frac{dy}{dv} + 3y = 0$

12. The differential equation $x\frac{d^2y}{dx^2} - \frac{dy}{dx} + 4x^3y = x^5$ can be solved by changing independent variable x to z by the relation $z =$__________.

A) x^2 B) $\frac{x^2}{2}$ C) $2x^2$ D) $2x$

13. The solution of $ayz\,dx + bzx\,dy + cxydz = 0$ is -----------.

A) $x^a y^b z^a = K$ B) $xyz = abc$ C) $x^a + y^b + z^a = K$ D) $x^2y^2z^2 = abc$

14. Let $y_0, y_1, \dots, y_n$ be a set of values of $y = f(x)$. Then $\Delta^2 y_0 =$ ------------.

A) $y_2 - 3y_1 + y_0$ B) $y_3 - 2y_2 + y_1$

C) $y_2 - y_0$ D) $y_2 - 2y_1 + y_0$

15. If the vector $\vec{f} = (x+3y)i + (y+2z)j + (x+az)k$ is solenoidal then $a =$-----------.

A) -1 B) 1 C) 2 D) -2

16. If C be a closed curve, then $\oint_C \bar{r}\,.\,d\bar{r}$ is -----------.

A) r B) r^2 C) $\frac{1}{r}$ D) 0

17. $\int_0^2 x^3(2-x)^{\frac{1}{2}}\,dx$ = ------------.

A) $16\sqrt{2}\,\beta\left(4,\frac{3}{2}\right)$ B) $\sqrt{2}\,\beta(2,3)$ C) $16\sqrt{2}$ D) $\beta\left(4,\frac{3}{2}\right)$

18. Let $I(t) = \int_0^\infty \frac{e^{-tx}\sin x}{x}\,dx$ then ------------.

A) $I(1) = 0$ B) $I(\infty) = 0$ C) $I(0) = 0$ D) $I(1) = 1$

19. Let $I(a) = \int_0^1 \frac{x^a - 1}{\log x} dx$, then $I'(a)$=-----------.

A) $log(a + 1)$ B) $\frac{1}{a+1}$ C) $\frac{1}{log(a+1)}$ D) $-\frac{1}{a+1}$

20. $erf_c(x) + erf_c(-x)$= ----------.

A) 2 B) 1 C) 0 D) $2erf_c(x)$

21. The argument of -1 is ....

A) 0
B) $\frac{\pi}{2}$
C) π
D) 2π

22. The function $f(z) = |z|^2$ is ....

A) entire
B) analytic everywhere
C) analytic at origin only
D) nowhere analytic

23. Limit of a complex function must be ....

A) real
B) imaginary
C) same from all paths
D) different from different paths

24. Real Part of analytic function is ....

A) zero
B) infinite
C) constant
D) harmonic

25. Liouville's theorem states that a bounded entire function is ....

A) polynomial
B) constant
C) Linear
D) zero

26. Laurent series includes ....

A) negative powers
B) positive powers
C) both positive and negative powers
D) none of the above

27. If $f(z) = 0$, then z is known as ....

A) zero
B) pole
C) singularity
D) none of the above

28. Residue at simple pole at $z = a$ of function $f(z)$ is .... in Laurent series expansion of $f(z)$ about $z = a$.

A) constant term
B) coefficient of $(z-a)$
C) coefficient of $(z-a)^2$
D) coefficient of $(z-a)^{-1}$

29. The value of the integral $\int_C \frac{dz}{z-2}$ where C is $|z+2| = 2$

A) 0
B) πi
C) $2\pi i$
D) $\frac{1}{2\pi i}$

30. The poles of the function $f(z) = \frac{\sin z}{z^3-3z^2+2z}$ are ....

A) $1, 2$
B) $0, 1, 2$
C) $-1, -2$
D) $0, -1, -2$

31. $\int_0^\infty e^{-2t}t^2 dt =$ ____.

A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{5}{6}$ D) $\frac{2}{3}$

32. $L\{(t+1)^2\} = \cdots ....$

A) $\frac{3}{s^3}+\frac{1}{s^2}+\frac{1}{s}$ B) $\frac{2}{s^3}+\frac{3}{s^2}+\frac{2}{s}$ C) $\frac{2}{s^3}+\frac{2}{s^2}+\frac{1}{s}$ D) $\frac{3}{s^3}+\frac{3}{s^2}+\frac{1}{s}$

33. If $L\{f(t)\} = f(s)$ and $G(t) = f(t-a),\ t > a,\ \ G(t) = 0,\ t < a$ then $L\{G(t)\} =$ ____.

A) $e^{as}.f(s)$ B) $e^{-as}\cdot f(s)$ C) $e^{-s}.f(s)$ D) $e^{-as}.f'(s)$

34. $s^3 f(s) - s^2 F(0) - sF'(0) - F''(0) =$:

A) $L[F''(t)]$ B) $L[F'(t)]$ C) $L[F'''(t)]$ D) $L[F''''(t)]$

35. $$L^{-1}\left\{\frac{1}{s^{3/2}}\right\} = \_\_\_\_$$

A) $\sqrt{\frac{t}{\pi}}$ B) $2\sqrt{\frac{t}{\pi}}$ C) $t^{3/2}$ D) $\sqrt{t}$

36. If $L\{F(t)\} = \frac{e^{-1/s}}{s}$, then find $L\{e^{-t}f(3t)\}$ is____

A) $\frac{e^{-1/(s+1)}}{s+1}$ B) $\frac{e^{-3/(s+1)}}{s+1}$ C) $\frac{e^{-3/s}}{s}$ D) $\frac{e^{-3/s}}{(s-1)}$

37. If $L^{-1}\{f(p)\} = F(t)$, then $L^{-1}\{f(ap)\}$ is equal to_____

A) $\frac{1}{a}F(at)$ B) $\frac{1}{a}F(t/a)$ C) $aF(at)$ D) $aF(t/a)$

38. Infinite inverse Fourier *cosine* transform of e^{-s} over $0 < s < \infty$ is ...

where $F(x) = \sqrt{\frac{2}{\pi}}\int_0^\infty f_s(s).\cos sxds$

A) $\sqrt{\frac{2}{\pi}}\cdot\frac{1}{(1+x^2)}$ B) $\sqrt{\frac{2}{\pi}}\cdot\frac{x}{(1-x^2)}$ C) $\sqrt{\frac{4}{\pi}}\cdot\frac{1}{(1+x^2)}$ D) $\sqrt{\frac{2}{\pi}}\cdot\frac{1}{(1-x^2)}$

39. Infinite Fourier sin transform of $\frac{1}{x}$ over $0 < x < \infty$ is ...

where $f_s(s) = \sqrt{\frac{2}{\pi}}\int_0^\infty F(x)\sin sxdx$

A) $\sqrt{\frac{\pi}{2}}$ B) $\sqrt{\frac{2}{\pi}}$ C) $\sqrt{\frac{1}{\pi}}$ D) $\sqrt{\frac{4}{\pi}}$

40. Let a function $f(t)$ be defined by $f(t) = \begin{cases} e^{-xt}\phi(t), & t > 0 \\ 0, & t < 0 \end{cases}$ then relation between Fourier transform and Laplace transform may be given by

A) $F\{f(t)\} = \frac{1}{\sqrt{2\pi}}L\{\phi(t)\}$ B) $F\left\{\frac{1}{f(t)}\right\} = \sqrt{2\pi}L\{\phi(t)\}$

C) $F\{f(t)\} = 4F\{\phi(t)\}$ D) none of these

41. The value of k for which the vector $(k, 13, 9)$ is a linear combination of $(1,2,3)$ and $(2,3,1)$ is ________.

A) 6
B) -4
C) 8
D) -3

42. If $T: \mathbb{R}^3 \longrightarrow \mathbb{R}^3$ is a homomorphism such that $T(1,0,0) = (1,0,0)$, $T(0,1,0) = (0,1,0)$ and $T(0,0,1) = (2,1,3)$ then $T(1,1,1) =$_______.

A) $(1,1,1)$
B) $(1,2,3)$
C) $(2,1,3)$
D) $(3,2,3)$

43. If T is a linear operator on R^2defined by $T(x_1\ ,\ x_2) = (0\ ,\ 0)$ then nullity of T =_____.

A) 3

B) 0

C) 2

D) 1

44. If $T: \mathbb{R}^2 \to \mathbb{R}^2$ defined by $T(x, y) = (x + y,\ x)$ is an invertible linear transformation, then $T^{-1}(a,\ b)$ =_______.

A) $(a,\ a - b)$
B) $(a,\ a + b)$
C) $(b,\ a + b)$
D) $(b,\ a - b)$

45. If $T: R^2 \to R^2$ and $S: R^2 \to R^3$ defined by $T(x, y) = (y, x)$ and $S(x, y) = (x + y, x - y, y)$ then $ST(x, y)$ =______ .

A) $(y + x,\ y - x,\ x)$
B) $(x - y,\ x + y,\ x)$
C) $(x - y,\ x + y,\ y)$
D) $(y + 2x,\ y - x,\ x)$

46. If $\|x\| = 3$ and $\|y\| = 4$ then $\|x + y\|^2 + \|x - y\|^2$ = _________.

A) 14
B) 25
C) 50
D) 12

47. A set $\{u_1, u_2, \dots, u_n\}$ of vectors in an Inner product space V is said to be orthogonal if __________.

A) $(u_i\ ,\ u_j) = 0$for all$i \neq j$
B) $(u_i\ ,\ u_j) = 1$for all $i \neq j$
C) $(u_i\ ,\ u_i) = 0$for all $i = 1,2,\dots,n$
D) $(u_i\ ,\ u_i) = 1$for all$i = 1,2,\dots,n$

48. If $A = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ then the characteristic polynomial of A is _________.

A) $x^2 + 1$
B) $x^2 - 1$
C) $x^2 + 2x + 1$
D) $x^2 + x$

49. If $T(x, y) = (x + y,\ x + y)$ then the eigenvector of T corresponding to the eigen value 0 is __________.

A) $(0,\ 1)$
B) $(1,\ 1)$
C) $(1, -1)$
D) $(-1, -1)$

50. If a 2×2 real matrix A has an eigenvalue 2 and its determinant is 6, then the trace of A is ________.
   A) 3
   B) 5
   C) 12
   D) 4

51. If a real valued function f is continuous on the compact metric space M then______.
   A) there exists atleast one point $x \in M$ such that f attains its maximum value at x.
   B) there exists only one point $x \in M$ such that f attains its maximum value at x.
   C) there exists atmost one point $x \in M$ such that f attains its maximum value at x.
   D) none of these

52. Consider the following statements
   I) Every totally bounded set is bounded.
   II)Every bounded set is totally bounded.
   Then_____.
   A) only I) is true
   B) only II) is true
   C) both I) and II) are true
   D) both I) and II) are false

53. If T is a contraction mapping on a metric space (M, ρ) then ______.
   A) T is decreasing
   B) T is discontinuous on M
   C) T is continuous on M.
   D) T is increasing.

54. In a discrete metric space $M = \mathbb{R}_d$, the real line with discrete metric, for any $a \in M$, $B[a; 1] =$ _______.
   A) R_d
   B) $(a-1, a+1)$
   C) $\{a\}$
   D) $(a, 1)$

55. The subset $A = [-1,1] \cup [2,3]$ of $\mathbb{R}^1$ is___________.
   A) closed and connected
   B) closed but not connected
   C) neither open nor closed
   D) connected but not closed

56. Which sequence is NOT Cauchy in $\mathbb{R}^1$?
   A) $\{\frac{1}{n}\}$
   B) $\{(-1)^n\}$
   C) constant sequence
   D) $\{\frac{n}{n+1}\}$

57. Which of the following set is totally bounded?
   A) $\mathbb{R}$
   B) $[0,1]$
   C) $(0, \infty)$
   D) $\mathbb{Q}$

58. Every Cauchy sequence in metric space $\mathbb{R}^2$is _______.
   A) divergent
   B) convergent
   C) oscillatory
   D) none of these.

59. If a metric space$< M, \rho >$ has Heine - Borel property, then M is_______.
   A) both complete and totally bounded
   B) neither complete nor totally bounded
   C) complete but not totally bounded
   D) totally bounded but not complete

60. Closure of a set is the smallest___________.
   A) open set containing it
   B) closed set containing it
   C) compact set containing it
   D) dense set containing it

61. Let H be any subgroup of a group G, then $a \equiv b \ mod\ H$ if ________.
   A) $a^2b \in H$
   B) $ab \in H$
   C) $ab^{-1} \in H$
   D) $ab^2 \in H$

62. Let H, K be any two subgroups of a group G with $o(H) = 5, o(K) = 4$ and $H \cap K = \{e\}$, then $o(HK) =$ __________.
   A) 5
   B) 4
   C) 10
   D) 20

63. In a group Z_7 with addition modulo 7, $4 \oplus_7 5 =$_________ .
   A) 9
   B) 7
   C) 2
   D) 4

64. What is the remainder when 2^{10} is divided by 11 ?
   A) 0
   B) 1
   C) 2
   D) 11

65. In a quotient group $\frac{G}{N}$, the inverse of element $Na \in \frac{G}{N}$ is ________.

A) N
B) Na
C) Na^{-1}
D) a^{-1}

66. If $f: G \to G'$ is a homomorphism, then $Ker\ f =$________, where e, e' are identity Of groups G, G' respectively.

A) $\{x \in G: f(x) = e'\}$
B) $\{x \in G: f(x) = e\}$
C) $\{x \in G: f(x) \neq e'\}$
D) $\{x \in G: f(x) \neq e\}$

67. Order of a permutation $(1\ 2\ 4\ 5)(3\ 6)$ is __________.

A) 1
B) 2
C) 4
D) 8

68. Consider the following statements
I) Every field is an integral domain
II) Every integral domain is field
Then____________.

A) Only I) is true.
B) Only II) is true
C) Both I) and II) are true
D) Both I) and II) are false

69. Characteristic of a ring Z_n is ____________.

A) 0
B) 1
C) n
D) Prime number

70. A ring R is called simple if _________

A) R has no ideals
B) R has only two ideals $\{0\}$ and R
C) R is commutative
D) Every element is unit

71. The graph of $x \leq 2$ and $y \geq 2$ will be situated in the______

A) first and second quadrant
B) second and third quadrant
C) first and third quadrant
D) third and fourth quadrant

72. In the simplex table the vector a_r enters the basis if the ratio of XB_i/a_{ir} is_____

A) Maximum
B) Minimum
C) Not restricted
D) Positive and minimum

73. An LPP with constraints $2x_1 + 2x_2 \leq 8$ and $x_1 + x_2 \leq 6$ which constraint can be ignored?

A) $2x_1 + 2x_2 \leq 8$
B) $x_1 + x_2 \leq 6$
C) both constraints are necessary
D) none of these

74. In a linear programming problem, a basic feasible solution is said to be non degenerate if _______ are non-zero.

A) all basic variables
B) some basic variables
C) all non-basic variables
D) some non-basic variables

75. For getting better solution of the transportation problem ,we use____

A) North west corner method
B) Least Cost entry method
C) Vogel's approximatin method
D) Dominance method

76. Consider the following statements for a LPP.

Statement I: Degeneracy occurs when a basic variable becomes zero.
Statement II: Degeneracy may cause cycling in simplex method.

A) Both statements are true
B) Both statements are false
C) Only Statement I is true
D) Only Statement II is true

77. Difference between smallest and second smallest cost for any row or a column in transportation problem is called______

A) allocation
B) penalty
C) cell evaluation
D) supply

78. In the Big-M method for a maximization problem, the coefficient of an artificial variable in the objective function is _____

A) $+M$
B) $-M$
C) zero
D) none of the above

79. Which of the following is true for a non-redundant constraint?

A) A constraint that can be removed without changing the solution
B) A constraint that does not affect the feasible region
C) A constraint whose removal changes the feasible region
D) A constraint that makes the problem infeasible

80. If any value in X_B Column of final simplex table is negative, then the solution is____
A) unbounded
B) infeasible
C) optimal
D) None of the above

81. If $A \subseteq B$, then for a function f,

A) $f(A) \subseteq f(B)$ B) $f(A) \supseteq f(B)$ C) $f(A) = f(B)$ D) $f(A) \cap f(B) = \phi$

82. For any function f, the inverse image satisfies

A) $f^{-1}(A \cup B) = f^{-1}(A) \cup f^{-1}(B)$ B) $f^{-1}(A \cup B) = f^{-1}(A) \cap f^{-1}(B)$
C) $f^{-1}(A \cap B) = f^{-1}(A) \cup f^{-1}(B)$ D) None

83. A bounded sequence has

A)Unique limit B)A convergent subsequence
C) Must converge D)Must diverge

84. If (a_n) is decreasing and bounded below, then

A) Divergent B) Unbounded C) Oscillatory D) Convergent

85. If $\lim a_n = L$ and $\lim b_n = M$, then $\lim (a_n b_n)$ is

A) $L + M$ B) $\frac{M}{L}$ C) $\frac{L}{M}$ D) LM

86. If a sequence is Cauchy, then it is

A)Unbounded B) Bounded C)Divergent D)Increasing

87. The series $\sum \frac{1}{n(n+1)}$ is

A)Divergent B)Convergent C)Oscillatory D)Conditionally convergent

88. If $0 \leq a_n \leq b_n$ and $\sum b_n$ converges, then $\sum a_n$

A) Diverges B) Oscillates C) Converges D)Not defined

89. A series $\sum a_n$ is absolutely convergent if

A) $\sum a_n$ converges B) $\sum |a_n|$ converges C) $a_n \to 0$ D) a_n bounded

90. The sequence $(a_n) \in \ell_2$ if

A) $\sum |a_n|$ converges B) $\sum a_n$ converges C) $\sum {a_n}^2$ converges D) $a_n \to 0$

91. What is the order of the partial differential equation obtained by eliminating the arbitrary constants from
$z = ae^{bx}\sin by$?
A) 1
B) 2
C) 3
D) 0

92. The general solution of the partial differential equation $yzp + xzq = xy$ is ...
A) $f(x-y, y-z) = 0$
B) $f(x^2+y^2, x^2+z^2) = 0$
C) $f(x+y, y+z) = 0$
D) $f(x^2-y^2, x^2-z^2) = 0$

93. A partial differential equation, by eliminating arbitrary function f from $z = f(x^2+y^2)$ is ...
A) $xp - yq = 0$
B) $xp + yq = 0$
C) $yp - xq = 0$
D) $yp + xq = 0$

94. In Lagrange's linear partial differential equation $Pp + Qq = R$, the auxiliary equations are...
A) $\frac{dx}{P} = \frac{dy}{Q} = \frac{dp}{R}$
B) $Pdx + Qdy = Rdz$
C) $Pdp + Qdq = Rdz$
D) $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$

95. A solution of the partial differential equation $(D^2 - D'^2)z = 0$ is ...
A) $z = f_1(y-x) + f_2(y+2x)$
B) $z = f_1(y-x) + xf_2(y+x)$
C) $z = f_1(y+x) + f_2(y-x)$
D) $z = f_1(y-2x) + f_2(y+2x)$

96. The Particular Integral (P.I.) of $f(D, D')z = F(x, y)$ where $F(x, y) = e^{ax+}$ is given by. . .

A) $\frac{1}{f(a,b)}e^{ax+by}$ (if $f(a, b) \neq 0$)

B) $\frac{1}{f(D,D')}\int e^{ax+by}$

C) $e^{ax+by}\log f(a, b)$

D) $\frac{x}{f(a,b)}e^{ax+by}$

97. A complete integral of the partial differential equation $p = q^2$ is . . .

A) $z = a^2x + a^2y + b$

B) $z = ax + a^2y + b$

C) $z = b^2x + by + c$

D) $log\, z = b^2x + by + c$

98. A complete integral of the partial differential equation $z = pq$ is . . .

A) $z = (x + ay + b)^2$

B) $4az = (x + ay + b)^2$

C) $z = (x + ay)^2 + b$

D) $z = (x + ay + b)$

99. A complete integral of the partial differential equation $pe^y = qe^x$ is . . .

A) $z = ae^x + ay + b$

B) $log\, z = ae^x + ae^y + b$

C) $z = ae^x + ae^y + b$

D) $log\, z = ae^x + ay + b$

100 A complete integral of the partial differential equation $z = px + qy - 2p - 3q$ is . . .

A) $z = ax + ay - 2a - 3b$

B) $z = ax + ay + 2a + 3b$

C) $z = ax + ay + 2a - 3b$

D) $z = ax + ay - 2a + 3b$

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ROUGH WORK