

## Mathematics

1. The equation of the line parallel to  $5x - 2y - 3 = 0$  and passing through the point  $(-1, 4)$  is

- |   |                    |   |                    |
|---|--------------------|---|--------------------|
| A | $5x - 2y - 13 = 0$ | B | $2x - 5y + 13 = 0$ |
| C | $5x - 2y + 13 = 0$ | D | $2x + 5y + 13 = 0$ |

2. The direction cosines of Y-axis are

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

3. The sum of the square of the first  $n$  natural numbers is

- |   |                          |   |                          |
|---|--------------------------|---|--------------------------|
| A | $\frac{n(n-1)(2n+1)}{6}$ | B | $\frac{n(n+1)(2n-1)}{6}$ |
| C | $\frac{n(n+1)(2n+1)}{6}$ | D | $\frac{n(n-1)(2n-1)}{6}$ |

4. The area of the triangle with vertices  $(0, 2)$ ,  $(4, 0)$  and  $(0, -2)$  is

- |   |         |   |               |
|---|---------|---|---------------|
| A | 8 unit  | B | 16 unit       |
| C | 12 unit | D | none of these |

5. The equation  $x^2 - y^2 - 6x + 2y + 7 = 0$  represents a

- |   |         |   |           |
|---|---------|---|-----------|
| A | circle  | B | parabola  |
| C | ellipse | D | hyperbola |

6. The value of  $\int_1^2 \frac{1}{x} dx$  is

- |   |                 |   |               |
|---|-----------------|---|---------------|
| A | 0               | B | $\log 2$      |
| C | $\log \sqrt{3}$ | D | None of these |

7. The volume of a spherical shell with radii 5 and 4 is

- |   |                     |   |                     |
|---|---------------------|---|---------------------|
| A | $\frac{244}{3} \pi$ | B | $\frac{500}{3} \pi$ |
| C | $\frac{256}{3} \pi$ | D | None of these       |

8. The center of the circle  $x^2 + y^2 - 12x + 4y - 9 = 0$  is

- |   |           |   |               |
|---|-----------|---|---------------|
| A | $(-6, 2)$ | B | $(6, -2)$     |
| C | $(6, 2)$  | D | None of these |

9. The angle made by the line  $x + y = 1$  with the positive direction of the X-axis is

- |   |             |   |             |
|---|-------------|---|-------------|
| A | $45^\circ$  | B | $120^\circ$ |
| C | $150^\circ$ | D | $135^\circ$ |

10. Let  $x^2 + y^2 - 4x + 2y - 4 = 0$  be a circle. The point  $(0,0)$  lies

- |   |                   |   |                    |
|---|-------------------|---|--------------------|
| A | inside the circle | B | outside the circle |
| C | on the circle     | D | None of these      |

11. The reflection of the origin with respect to the line  $x + y = 1$  is

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

12. The vertex of the parabola  $y^2 - 4x - 8 = 0$

- |   |          |   |               |
|---|----------|---|---------------|
| A | $(2,0)$  | B | $(0,2)$       |
| C | $(0,-2)$ | D | None of these |

13. When two circles touches externally to each other?

- A Distance between the centers is greater than the sum of their radius.
- B Distance between the centers is less than the sum of their radius.
- C Distance between the centers is equal to the sum of their radius.
- D None of these

14. The displacement of a moving particle is given by  $s = 8t^2 + 1$ , then its velocity at time  $t = 2$  sec is

- |   |                |   |               |
|---|----------------|---|---------------|
| A | 23.33 unit/sec | B | 32 unit/sec   |
| C | 33 unit/sec    | D | None of these |

15. The value of  $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin(x - \frac{\pi}{4})}{x - \frac{\pi}{4}}$  is

- |   |   |   |               |
|---|---|---|---------------|
| A | 0 | B | $\frac{1}{2}$ |
| C | 1 | D | None of these |

16. The general solution of  $\cos x = 0$  is

- |   |                       |   |               |
|---|-----------------------|---|---------------|
| A | $\frac{n\pi}{2}$      | B | $n\pi$        |
| C | $\frac{(2n+1)\pi}{2}$ | D | None of these |

17. The degree of the differential equation  $1 + \left(\frac{dy}{dx}\right)^2 = \frac{d^2y}{dx^2}$  is

- |   |               |   |   |
|---|---------------|---|---|
| A | 1             | B | 2 |
| C | $\frac{1}{2}$ | D | 4 |

18. If  $z = -1 - i$ , then the value of  $\text{Arg}(z)$  is

- |   |                  |   |                  |
|---|------------------|---|------------------|
| A | $\frac{\pi}{4}$  | B | $\frac{3\pi}{4}$ |
| C | $\frac{5\pi}{4}$ | D | None of these.   |



27. The value of  $\int_0^1 \frac{\tan^{-1} x}{1+x^2} dx$  is

A  $-\frac{\pi^2}{32}$

B  $\frac{3\pi}{16}$

C  $\frac{\pi^2}{32}$

D None of these

28. If  $\frac{dy}{dx} - \frac{1}{\sqrt{1-x^2}} = 0$ , then which of the following is true:

A  $y - \sin^{-1} x = c$

B  $y + \sin^{-1} x = c$

C  $x - \sin^{-1} y = c$

D None of these

29. If  $\sin x + \cos x = 0$ , then  $x$  is

A  $45^\circ$

B  $135^\circ$

C  $125^\circ$

D  $90^\circ$

30. The value of  $\cos(A+B)$  is

A  $\sin A \cos B + \cos A \sin B$

B  $\cos A \cos B - \sin A \sin B$

C  $\cos A \cos B + \sin A \sin B$

D  $\sin A \cos B - \cos A \sin B$

31. If  $f(x) = \begin{cases} 2x-3, & x < 0 \\ 2x+3, & x \geq 0 \end{cases}$ , then the function is

A continuous everywhere

B continuous no-where

C continuous except at  $x = 0$

D continuous only at  $x = 0$

32. The distance of the point  $A(2,0)$  from the line  $x + y = 1$  is

A 2

B  $\frac{1}{\sqrt{2}}$

C  $\sqrt{2}$

D None of these

33. The value of  $\cos(-315^\circ)$  is

A  $\frac{1}{\sqrt{2}}$

B  $-\frac{1}{\sqrt{2}}$

C  $\frac{\sqrt{3}}{2}$

D  $-\frac{\sqrt{3}}{2}$

34. The value of  $\tan 1^\circ \tan 2^\circ \tan 3^\circ \dots \tan 88^\circ \tan 89^\circ$  is

A 0

B -1

C 1

D None of these

35. The principle value of the argument of the complex number  $\sqrt{3} + i$ , ( $i = \sqrt{-1}$ ) is

- |   |                   |   |                  |
|---|-------------------|---|------------------|
| A | $\frac{\pi}{6}$   | B | $\frac{5\pi}{6}$ |
| C | $\frac{11\pi}{6}$ | D | None of these    |

36. If  $\alpha$  and  $\beta$  be the roots of the equation  $x^2 + 5x + 1 = 0$ , then the value of  $\alpha^2 + \beta^2$  is

- |   |    |   |               |
|---|----|---|---------------|
| A | 25 | B | 27            |
| C | 23 | D | None of these |

37. The square root of  $i$  is

- |   |                               |   |                               |
|---|-------------------------------|---|-------------------------------|
| A | $\pm \frac{1}{\sqrt{2}}(1+i)$ | B | $\pm \frac{1}{\sqrt{2}}(1-i)$ |
| C | $\pm \frac{1}{2}(1+i)$        | D | $\pm \frac{1}{2}(1-i)$        |

38. If  $w$  is the imaginary cube root of unity, then the value of  $(1 - w^7 - w^8)(1 - w^4 + w^5)$  is

- |   |            |   |               |
|---|------------|---|---------------|
| A | 0          | B | -4            |
| C | $-4\omega$ | D | None of these |

39. The value of the determinant  $A = \begin{vmatrix} \cos x & \sin x \\ -\sin x & \cos x \end{vmatrix}$  is

- |   |   |   |                 |
|---|---|---|-----------------|
| A | 1 | B | -1              |
| C | 0 | D | $\sin x \cos x$ |

40. In how many ways can the result of three successive football matches between Brazil and Argentina be decided?

- |   |    |   |    |
|---|----|---|----|
| A | 9  | B | 3  |
| C | 27 | D | 81 |

41. The value of  $\int_{-a}^a f(x)dx$ , where  $f(x)$  is an even function is

- |   |                    |   |                |
|---|--------------------|---|----------------|
| A | $a^2$              | B | 0              |
| C | $2\int_0^a f(x)dx$ | D | does not exist |

42. If  $A = \begin{pmatrix} 2 & 1 \\ 5 & 3 \end{pmatrix}$  and  $B = \begin{pmatrix} 1 & 3 & 0 \\ 2 & 5 & 7 \end{pmatrix}$ , then which of the following statement is FALSE:

- |   |                 |   |                         |
|---|-----------------|---|-------------------------|
| A | AB exists       | B | BA exists               |
| C | $A^{-1}$ exists | D | $B^{-1}$ does not exist |

43. The value of  $\log_4 \{\log_{25} 9 \times \log_9 25\}$  is

- |   |   |   |               |
|---|---|---|---------------|
| A | 0 | B | 1             |
| C | 2 | D | None of these |

44. The value of  $\lim_{x \rightarrow 0} (1+x)^{1/x}$  is

- |   |   |   |               |
|---|---|---|---------------|
| A | e | B | $\frac{1}{e}$ |
| C | 1 | D | 0             |

45. In how many ways can five persons be seated around a circular table?

- |   |    |   |     |
|---|----|---|-----|
| A | 25 | B | 24  |
| C | 20 | D | 120 |

46. The expression for  $\log_e(1+x)$  is

- A  $1 - \frac{x}{1!} + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots$
- B  $1 - \frac{x}{1} + \frac{x^2}{2} - \frac{x^3}{3} + \dots$
- C  $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots$
- D None of these

47. Let  $f(x) = \begin{cases} 3x, & 0 \leq x \leq 2 \\ \lambda, & 2 < x \leq 3 \end{cases}$ , if  $f(x)$  is continuous at  $x = 2$  then  $\lambda$  is

- |   |    |   |   |
|---|----|---|---|
| A | 3  | B | 0 |
| C | -6 | D | 6 |

48. the 15<sup>th</sup> term of the series  $1 + 4 + 7 + 10 + \dots$  is

- |   |    |   |    |
|---|----|---|----|
| A | 46 | B | 45 |
| C | 44 | D | 43 |

49. The value of  $\lim_{x \rightarrow 3} \frac{x^3 - 27}{x - 3}$  is

- |   |                |   |    |
|---|----------------|---|----|
| A | does not exist | B | 27 |
| C | 0              | D | 9  |

50. If  $z$  be any complex number, then  $z - \bar{z}$  is

- |   |             |   |                  |
|---|-------------|---|------------------|
| A | Purely real | B | Purely imaginary |
| C | Zero        | D | None of these    |

51. How many equations are required to represent a curve in space?

- |   |   |   |               |
|---|---|---|---------------|
| A | 1 | B | 2             |
| C | 3 | D | None of these |

52. The ratio of the perimeter to its diameter of a circle is

- |   |        |   |               |
|---|--------|---|---------------|
| A | $\pi$  | B | $2\pi$        |
| C | $3\pi$ | D | None of these |

53. A coin is tossed four times. In how many different ways can we obtain one head and three tails?

- |   |   |   |               |
|---|---|---|---------------|
| A | 1 | B | 2             |
| C | 3 | D | None of these |

54. In how many ways can a committee of eight be chosen from ten individuals?

- |   |              |   |               |
|---|--------------|---|---------------|
| A | ${}^{10}P_8$ | B | ${}^{10}C_8$  |
| C | 80           | D | None of these |

55. The distance,  $s$  traversed by a particle in a straight line from the origin, at any time  $t$  is given by  $s = 2t^2 + 3t$ . The velocity of the particle at 4 second is

- |   |    |   |               |
|---|----|---|---------------|
| A | 19 | B | 44            |
| C | 20 | D | None of these |

56. Find the magnitude of the vector  $\hat{a} = 2\hat{i} - 3\hat{j} + \hat{k}$ .

- |   |             |   |               |
|---|-------------|---|---------------|
| A | $\sqrt{6}$  | B | 14            |
| C | $\sqrt{14}$ | D | None of these |

57. How many seven digits telephone numbers are possible, if only odd digits may be used?

- |   |           |   |           |
|---|-----------|---|-----------|
| A | ${}^7P_5$ | B | ${}^7C_5$ |
| C | $5^7$     | D | $7^5$     |

58. The total number of subsets of a set having  $n$  elements is

- |   |           |   |           |
|---|-----------|---|-----------|
| A | $n^2$     | B | $2^n$     |
| C | ${}^nP_2$ | D | ${}^nC_2$ |

59. The sum of the square of the direction cosines of a Straight line is

- |   |   |   |               |
|---|---|---|---------------|
| A | 0 | B | 1             |
| C | 2 | D | None of these |

60.  $\int \sec x dx =$

- |   |                            |   |                            |
|---|----------------------------|---|----------------------------|
| A | $\log_e \tan x$            | B | $\log_e (\sec x - \tan x)$ |
| C | $\log_e (\sec x + \tan x)$ | D | $\tan x$                   |

61.  $\int \left( \frac{e^{\sin^{-1} x}}{\sqrt{1-x^2}} \right) dx$  is

- |   |                                   |   |                               |
|---|-----------------------------------|---|-------------------------------|
| A | $e^{\sin^{-1} x}$                 | B | $\sin^{-1} x e^{\sin^{-1} x}$ |
| C | $e^{\operatorname{cosec}^{-1} x}$ | D | None of these                 |

62. If a set A has 3 elements, the total number of functions from A to itself is

- |   |   |   |               |
|---|---|---|---------------|
| A | 9 | B | 6             |
| C | 1 | D | none of these |

63. The family of straight lines passing through the origin is represented by the differential equation

A  $ydx + xdy = 0$

B  $xdy - ydx = 0$

C  $xdx + ydy = 0$

D  $ydy + xdx = 0$

64. A line makes an angles  $\alpha, \beta, \gamma$  with the co-ordinate axes ,then  $\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma =$

A 0

B 1

C -1

D none of these

65. A matrix A is invertible (the inverse of a matrix exist) if its determinant value is

A 0

B 1

C non zero

D none of these

66. The sum of the series  $2 + 4 + 6 + \dots$  up to 20 terms is

A 440

B 320

C 420

D 340

67. Extreme value of  $f(x) = x^2 - x$  is at  $x =$

A 0

B  $\frac{1}{2}$

C 1

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

68. Maximum possible value of  $\sin \theta$  is

A 0

B 1

C -1

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

69. The tangent to a curve touches it at

A only one point

B two points

C infinite number of points

D none of these

70. If  $\lim_{x \rightarrow a} f(x)$  exists then which one of these is true

A  $f(x)$  is always continuous at  $x = a$

B  $f(x)$  is always derivable at  $x = a$

C  $f(x)$  is always discontinuous at  $x = a$

D  $f(x)$  is continuous at  $x = a$  if  $\lim_{x \rightarrow a} f(x) = f(a)$

71. If for  $y = f(x)$ ,  $\frac{dy}{dx} = 0$  at  $x = 2$  then which one of these is true

A tangent at  $x = 2$  to  $y = f(x)$  is parallel to X axis

B tangent at  $x = 2$  to  $y = f(x)$  is parallel to Y axis

C tangent at  $x = 2$  to  $y = f(x)$  does not exist

D none of these

72. A person can arrange 5 books on a shelf in

- |   |         |   |          |
|---|---------|---|----------|
| A | 5 ways  | B | 120 ways |
| C | 24 ways | D | 25 ways  |

73. The number of three digit numbers formed from the digits 0,1,2,3 is

- |   |    |   |    |
|---|----|---|----|
| A | 64 | B | 48 |
| C | 24 | D | 12 |

74. The determinant value of the matrix  $A = \begin{bmatrix} 1 & 4 & 8 \\ 0 & 3 & 6 \\ 0 & 2 & 4 \end{bmatrix}$  is

- |   |   |   |    |
|---|---|---|----|
| A | 1 | B | -1 |
| C | 0 | D | 12 |

75. If  $A = \begin{pmatrix} 2 & 1 \\ 0 & 3 \end{pmatrix}$  and  $B = \begin{pmatrix} 5 & 0 \\ 4 & 2 \end{pmatrix}$ , then  $AB + I =$

- |   |  |   |  |
|---|--|---|--|
| A | $\begin{pmatrix} 15 & 12 \\ 2 & 7 \end{pmatrix}$ | B | $\begin{pmatrix} 15 & 2 \\ 12 & 7 \end{pmatrix}$ |
| C | $\begin{pmatrix} 7 & 2 \\ 12 & 15 \end{pmatrix}$ | D | $\begin{pmatrix} 12 & 7 \\ 15 & 2 \end{pmatrix}$ |

76. If  $A = \begin{pmatrix} 3 & 5 \\ 5 & 2 \end{pmatrix}$ , then which of the following statement is FALSE

- |   |                                |   |                                |
|---|--------------------------------|---|--------------------------------|
| A | $A$ is a symmetric matrix      | B | transpose of $A$ is $A$ itself |
| C | $A$ is a anty-symmetric matrix | D | None of these                  |

77. If  $f(x) = x^2$  and  $g(x) = e^x$  then which of the following statement is TRUE

- |   |  |
|---|--|
| A | $f(g(x)) = g(f(x))$                            |
| B | $f(g(x)) \neq g(f(x))$                         |
| C | $f(g(x))$ and $g(f(x))$ may or may not be same |
| D | None of these                                  |

78. If  $f(x) = \sin x$  and  $g(x) = \log x$  then the value of  $g(f(x))$  at  $x = \frac{\pi}{2}$  is

- |   |    |   |               |
|---|----|---|---------------|
| A | 0  | B | 1             |
| C | -1 | D | None of these |

79. If  $a^x = b$  then  $x =$

- |   |             |   |               |
|---|-------------|---|---------------|
| A | $\log_a b$  | B | $\log_b a$    |
| C | $\log_e ab$ | D | None of these |

80. If  $2A - 3B = I$ , where  $I = \begin{pmatrix} 1 & 0 \\ 0 & 0 \end{pmatrix}$ ,  $A = \begin{pmatrix} 2x+1 & 3 \\ 6 & 2y-1 \end{pmatrix}$  and  $B = \begin{pmatrix} 3 & 2 \\ 4 & 2 \end{pmatrix}$  then

- |   |                     |   |                     |
|---|---------------------|---|---------------------|
| A | $x = 0$ and $y = 2$ | B | $x = 2$ and $y = 0$ |
| C | $x = 2$ and $y = 2$ | D | $x = 0$ and $y = 0$ |

81. If  $A = \{x : 0 \leq x \leq 5\}$  and  $B = \{x : 2 < x < 7\}$  then  $A \cap B =$

- |   |                           |   |                     |
|---|---------------------------|---|---------------------|
| A | $\{x : 2 \leq x \leq 5\}$ | B | $\{x : 2 < x < 5\}$ |
| C | $\{x : 2 < x \leq 5\}$    | D | None of these       |

82. If  $\vec{a} = 2\vec{i} + 3\vec{j} + \vec{k}$  and  $\vec{b} = \vec{i} + 2\vec{j} - 4\vec{k}$  then  $\vec{a} \cdot \vec{b} =$

- |   |    |   |   |
|---|----|---|---|
| A | 10 | B | 8 |
| C | 6  | D | 4 |

83.  $\frac{d}{dx}(\sec^{-1}x)$  is

- |   |                             |   |                             |
|---|-----------------------------|---|-----------------------------|
| A | $\frac{1}{\sqrt{x^2 - 1}}$  | B | $\frac{1}{x\sqrt{x^2 - 1}}$ |
| C | $\frac{-1}{\sqrt{x^2 - 1}}$ | D | $\frac{x}{\sqrt{x^2 - 1}}$  |

84. The value of  $\sum_{n=0}^{\infty} \frac{1}{n!}$  is

- |   |               |   |               |
|---|---------------|---|---------------|
| A | $\frac{1}{e}$ | B | $e$           |
| C | 1             | D | None of these |

85.  $\frac{d}{dx}(x^x)$  is

- |   |                   |   |                      |
|---|-------------------|---|----------------------|
| A | $e^{x \log x}$    | B | $\frac{1}{x} \log x$ |
| C | $x^x(1 - \log x)$ | D | $x^x(1 + \log x)$    |

86. Divide the number 15 into three such parts that they may form an A.P., and that the product of the first two parts may be 80. The parts are

- |   |         |   |               |
|---|---------|---|---------------|
| A | 2, 5, 8 | B | 1, 5, 9       |
| C | 3, 5, 7 | D | None of these |

87. The equation of Z-axis is

- |   |             |   |                |
|---|-------------|---|----------------|
| A | $z = 0$     | B | $x = 0, y = 0$ |
| C | $x = y = z$ | D | None of these  |

88. Which term of the G.P., 2, 6, 18, 54... is 1458?

- |   |                      |   |                      |
|---|----------------------|---|----------------------|
| A | 9 <sup>th</sup> term | B | 8 <sup>th</sup> term |
| C | 7 <sup>th</sup> term | D | 6 <sup>th</sup> term |

89. The value of  $\sin^{-1} x + \cos^{-1} x$  is

- |   |                 |   |               |
|---|-----------------|---|---------------|
| A | 0               | B | $\pi$         |
| C | $\frac{\pi}{2}$ | D | None of these |

90. If  $y = e^x \cos x$  then  $\frac{dy}{dx}$  at  $x = 0$  is

- |   |    |   |                |
|---|----|---|----------------|
| A | -1 | B | 1              |
| C | 0  | D | does not exist |

91. The differential equation  $(e^x + 1)dy = (y + 1)e^x dx$  has the solution

- |   |                        |   |                        |
|---|------------------------|---|------------------------|
| A | $y + 1 = c(e^x + 1)$   | B | $(1 + y)(e^x + 1) = c$ |
| C | $(1 + y)(e^x + 2) = c$ | D | $(1 + y)(e^x + 1) = c$ |

92. The domain of  $f(x) = \frac{1}{\sqrt{x-4}}$  is

- |   |                    |   |                            |
|---|--------------------|---|----------------------------|
| A | $\{x   x \leq 4\}$ | B | $\{x   -4 \leq x \leq 4\}$ |
| C | $\{x   x > 4\}$    | D | $\{x   0 < x \leq 4\}$     |

93. In a  $\Delta ABC$ , if  $a = 18, b = 24, c = 30$  then its area is

- |   |               |   |               |
|---|---------------|---|---------------|
| A | 96 sq. units  | B | 612 sq. units |
| C | 216 sq. units | D | None of these |

94. What must be the matrix  $X$  if  $2X + \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} = \begin{pmatrix} 3 & 8 \\ 7 & 2 \end{pmatrix}$ ?

- |   |   |   |  |
|---|---|---|--|
| A | $\begin{pmatrix} 1 & 3 \\ 2 & -1 \end{pmatrix}$ | B | $\begin{pmatrix} 1 & -3 \\ 2 & -1 \end{pmatrix}$ |
| C | $\begin{pmatrix} 2 & 6 \\ 4 & -2 \end{pmatrix}$ | D | $\begin{pmatrix} 2 & -6 \\ 4 & -2 \end{pmatrix}$ |

95. If A and B are two matrices such that A+B and AB are both define, then A and B are

- |   |                                    |   |                        |
|---|------------------------------------|---|------------------------|
| A | both null matrices                 | B | both identity matrices |
| C | both square matrices of same order | D | None of these          |

96. The value of  $\lim_{x \rightarrow 3} \frac{x-3}{|x-3|}$  is

A 0  
C -1

B 1  
D does not exist

97. The function  $f(x) = x^3$  is

A increasing only in  $(0, 1)$   
C every where increasing

B decreasing in  $(0, 1)$   
D every where decreasing

98. The area of the ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$  in the first quadrant is

A  $\frac{\pi}{4ab}$   
C  $\frac{\pi ab}{4}$

B  $\frac{\pi ab}{2}$   
D None of these

99. The order of the differential equation  $\left(\frac{dy}{dx}\right)^2 + \left(\frac{d^2y}{dx^2}\right)^3 = 0$  is

A 2  
C 6

B 3  
D 1

100. The value of  $k$  for which  $3x^2 - 8xy + ky^2 = 0$  represents two perpendicular lines is

A 3  
C  $-\frac{3}{2}$

B -3  
D  $-\frac{2}{3}$