12th Mathematics

Full book solved MCQs

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Objective Type

1. Encircle the Correct Option.

1. درست جواب کے گرد دائرہ لگائیں۔

1) If xy − coordinates of a point are $(3, 2)$ and axes are translated through $O'(1, 3)$ then XY − coordinates will be

a) $(-1, 2)$	b) $(1, 2)$	✔c) $(2, -1)$	d) $(-2, -1)$

2) $\int e^{2x}[2\cos x - \sin x]dx$

a) $e^{2x}\ 2\cos x + c$	b) $e^{2x}\ \sin x + c$	✔c) $e^{2x}\ \cos x + c$	d) $-e^{2x}\ \sin x + c$

3) Equation of the line with y − intercept : −7 and slope −5 is

a) 5x − y = 7	b) y = 7 − 5x	✔c) 5x + y + 7 = 0	d) y = 5x − 7

4) If $\underline{a}$ and $\underline{b}$ are two non − zero vectors, then a vector perpendicular to each of the vectors is

✔a) $\underline{a} \times \underline{b}$	b) $\lvert\underline{b} \times \underline{a}\rvert$	c) $\underline{a}.\underline{b}$	d) $\underline{b}.\underline{a}$

5) The maximum and minimum values of the objective function occur in the feasible region at:

a) Origin	✔b) Corner points	c) Any point	d) Both a and b

6) Parallelogram law of addition of vectors was used by

a) Newton	✔b) Aristotle	c) Leibniz	d) Lagrange

7) $\frac{d}{dx}\left(\sin^{-1}\left(\frac{a}{x}\right)\right) =$

a) $\frac{-1}{x\sqrt{x^2 - a^2}}$	✔b) $\frac{-a}{x\sqrt{x^2 - a^2}}$	c) $\frac{a}{x\sqrt{a^2 - x^2}}$	d) $\frac{1}{\sqrt{x^2 - a^2}}$

8) If the cutting plane is parallel to the axis of the cone and intersects both nappes, then curve of intersection is a

✔a) Hyperbola	b) Circle	c) Elliplse	d) Parabola

9) For all non−zero values of m, $y = mx \pm \sqrt{a^2m^2 - b^2}$

a) $y^2 = 4ax$	✔b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$	c) $x^2 + y^2 = a^2$	d) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

10) Angle between non zero vectors $\underline{u}$ & $\underline{v}$ is 0 or π then these vectors are

a) Parallel	b) Collinear	✔c) Both 'a' and 'b'	d) None of these

11) For a conic the fixed line L is called a

✔a) Directrix	b) Vertex	c) Axes	d) Latusrectum

12) If foci are $(2 \pm 5\sqrt{2}, -7)$ and length of the transverse axis 10, so then equation of hyperbola is

a) $\frac{y^2}{36} - \frac{x^2}{45} = 1$	b) $\frac{(x-2)^2}{9} - \frac{(y-2)^2}{27} = 1$	c) $\frac{(y-1)^2}{5} - \frac{(x-5)^2}{4} = 1$	✔d) $\frac{(x-2)^2}{25} - \frac{(y+7)^2}{25} = 1$

13) An equation of circle with radius 'r' and lying in fourth quadrant such that it is tangent to both axes is

a) $(x + r)^2 + (y + r)^2 = r^2$	b) $(x - r)^2 + (y - r)^2 = r^2$	c) $(x + r)^2 - (y - r)^2 = r^2$	✔d) $(x - r)^2 - (y - r)^2 = r^2$

14) Two intercepts form of $2x - 4y + 11 = 0$ is

a) $y = \frac{x}{2} + \frac{11}{4}$	b) $\frac{x}{\frac{11}{2}} + \frac{y}{\frac{11}{4}} = 1$	✔c) $\frac{x}{\frac{-11}{2}} + \frac{y}{\frac{11}{4}} = 1$	d) $y = 2x + \frac{11}{4}$

15) If $f(x) = |x|$ is

a) $(-\infty, 0]$	✔b) $[0, +\infty)$	c) $(-\infty, \infty)$	d) $(-\infty, 1]$

16) A function in which the variable appears as exponent is called:

a) Logarithmic function	b) Rotational function	✔c) Exponential function	d) Constant function

17) If $y = \tan^2 x$, then $\frac{dy}{dx} =$

a) $2\tan x \sec^2 x$	b) $\tan x \sec^2 x$	c) $\tan^2 x \sec^2 x$	d) $2 \tan x \sec x$

18) $\frac{d}{dx}(3^x) =$

a) $\frac{3x}{\ln 3}$	b) 3^x	✔c) $3^x . \ln 3$	d) $x3^{x-1}$

19) Implicit relation is symbolically written as

a) $y = f(x)$	✔b) $f(x, y) = 0$	c) $x = f(t), y = g(t)$	d) $y = f(u), u = g(x)$

20) The difference of focal distances of any point on hyperbola is

a) 2a	b) −2a	✔c) $\pm 2a$	d) a

21) All the points on a vertical line remain at a constant distance from

a) x − axis	✔b) y − axis	c) Both axes	d) Origin

22) Inclination of a line passing through $(0, 2)$ and $(0, 4)$ is

a) 30^o	b) 60^o	c) 45^o	✔d) 90^o

23) $f(x) = e^x(1 + \ln x)$ then $f'(x)$

a) $\frac{e^x}{x}$	✔b) $\frac{e^x}{x} + (1 + \ln x)\, e^x$	c) $-\frac{e^x}{x}$	d) $e^x \ln x + \frac{1}{x}$

24) $(3, 2)$ is not in the solution of inequality:

a) $x + y > 2$	✔b) $x + y \leq 1$	c) $3x + 5y > 7$	d) $3x + 7y > 3$

25) If $f(x)$ = a cos 3x and $f'\left(\frac{\pi}{2}\right)$ = 6 then 'a' equals

a) $-\frac{1}{2}$	b) $\frac{1}{2}$	✔c) 2	d) −2

26) The differential of x is denoted by

✔a) dx	b) $(dx)'$	c) $\frac{dx}{dy}$	d) None

27) If $\underline{v} = a\hat{\imath} + b\hat{\jmath} + c\hat{k}$, then projection of $\underline{v}$ along $\hat{\imath}$ is

a) c	b) b	✔c) a	d) None

28) $\underline{u}.\underline{u}$ = ?

✔a) $\lvert\underline{u}\rvert^2$	b) $\lvert\underline{u}\rvert$	c) Zero	d) 1

29) Equation of horizontal lin passing through $(-5, 3)$ is

a) x = −5	✔b) y = 3	c) 3x − 5y = 0	d) 5x + 3y = 0

30) Mid point of Hypotenuse of a right triangle is equidistance from its

a) Mid points of sides	b) Right bisectors	✔c) Vertices	d) All of these

31) The line y = mx + c intersects the circle $x^2 + y^2 = a^2$ in at most

✔a) Two points	b) Three points	c) One point	d) Four points

32) The domain of $\tanh^{-1} x = \frac{1}{2} ln \left(\frac{1+x}{1-x}\right)$ is

✔a) $\lvert x\rvert < 1$	b) $\lvert x\rvert \leq 1$	c) $\lvert x\rvert \geq 1$	d) $\lvert x\rvert > 1$

33) The derivative of $\cos^{-1} x$ at x = 0 is

a) zero	✔b) −1	c) 1	d) 2

34) If $f(x) = \sqrt{x+4}$, then $f(x^2 + 4)$

a) $\sqrt{x^2+4}$x	✔b) $\sqrt{x^2+8}$	c) $\sqrt{x^2+8}$	d) x

35) The solution set of the inequality ax + by > c is:

a) Closed half plane	b) Circle	✔c) Open half plane	d) Parabola

36) $\int_{-1}^{2} (x + |x|)dx = ?$

a) 1	b) 2	✔c) 4	d) 8

37) If y = f(x) and x = g(y) are inverse of each other, then f(g(y)) =

✔a) y	b) x	c) x/y	d) xy

38) The solution region which can be enclosed by a circle is called:

✔a) convex region	b) Unbounded region	c) Circular region	d) Non-convex region

39) A vertical line divides the plane into two half planes:

✔a) Left and Right	b) Upper and lower	c) Both a and b	d) Open half plane

40) The ellipse and hyperbola are called central conics because each has a

✔a) Centre of symmetry	b) Focal chord	c) Axis of symmetry	d) Latus rectum

41) If $x = a^y$, then $y = \log_a x$, $a > 0, a \neq 1$ is called

✔a) Logarithmic function	b) Exponential function	c) Hyperbolic function	d) Trigonometric function

42) The length of the tangent from a point $P(x_1, y_1)$ to the circle $x^2 + y^2 + 2gx + 2fy + c = 0$ is

a) $\sqrt{x^2+y^2+2gx+2fy+c}$	✔b) $\sqrt{x_1^2+y_1^2+2gx_1+2fy_1+c}$	c) $x_1^2 + y_1^2 = a^2$	d) $x_1^2+y_1^2+2gx_1+2fy_1+c$

43) In the graph of $y = e^x$, $e^x = 1$ when

a) $x \to -\infty$	b) $x \to -\infty$	c) $x \to 1$	✔d) $x = 0$

44) The solution of differential equation $\frac{d}{dx} = -y$ is

a) $y = e^{-x}$	✔b) $y = ce^{-x}$	c) $y = ce^x\,dx$	d) $y = e^x$

45) Work done of a force on a particle is

✔a) Scalar quantity	b) Vector quantity	c) Zero	d) None

46) An equation of ellipse with foci $(-3\sqrt{3}, 0)$ and vertices $(\pm 6, 0)$ is

a) $\frac{y^2}{36}+\frac{x^2}{9}=1$	b) $\frac{x^2}{36}-\frac{y^2}{9}=1$	✔c) $\frac{x^2}{36}+\frac{y^2}{9}=1$	d) $\frac{y^2}{36}-\frac{x^2}{9}=1$

47) The fixed point from which all the points of circle are equidistant is called

a) Vertex	✔b) Centre	c) Origin	d) Radius

48) The direction cosine of z – axis are

a) [1, 0, 0]	b) [0, 1, 0]	✔c) [0, 0, 1]	d) [1, 1, 1]

49) $\int \frac{1}{\sqrt{a^2+x^2}}\,dx =$

✔a) $\frac{1}{a}\sinh^{-1}\left(\frac{x}{a}\right)+c$	b) $\sinh^{-1}\left(\frac{x}{a}\right)+c$	c) $-\frac{1}{a}\sinh^{-1}\left(\frac{x}{a}\right)+c$	d) $\frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right)+c$

50) A point of a solution region where two of its boundary lines intersect, is called:

a) Origin	b) Test point	✔c) Corner point	d) Half plane

51) Directrices of hyperbola $\frac{x^2}{b^2}-\frac{y^2}{a^2}=1$ are

a) $y = \pm\frac{c}{e^2}$	b) y = 0	✔c) $x = \pm\frac{c}{e^2}$	d) x = 0

52) If $f(x) = (x + 1)$, then value of $f^3(x)$ is

a) $(x + 1)^3$	b) $(x^3 + 1)$	✔c) $(x + 3)$	d) $(x + 3)^3$

53) If $\int_0^1 (4x + k)dx = 2$ then k =

✔a) zero	b) 2	c) 1	d) 4

54) The common intersecting point of all the generators of the cone is called

a) Centroid	b) Apex	c) Vertex	✔d) Both b & c

55) The minimum value of $f(x) = x^2 - x - 2$ is

a) $-\frac{4}{9}$	b) $\frac{9}{4}$	✔c) $-\frac{9}{4}$	d) $\frac{4}{9}$

56) The graph of $\frac{x^2}{4} + \frac{y^2}{9} = 1$ is symmetrical about

a) x − axis	b) y − axis	c) Origin	d) Both axes and origin

57) The perpendicular distance from the point (2, 1) to the line 3x + 4y + 5 = 0 is

a) 10	✔b) 3	c) $\frac{4}{3}$	d) $\frac{3}{5}$

58) If any two non−zero vector are equal in scalar triple product, then its value is

✔a) zero	b) 10	c) 2	d) 1

59) The equation $ax^2 + by^2 + 2hxy + 2gx + 2fy + c = 0$ represents a circle if

a) $a \neq b, h \neq 0$	b) $a \neq b, h = 0$	c) $a = b, h \neq 0$	✔d) $a = b, h = 0$

60) Foci of an ellipse always lie on

a) Centre	✔b) Major axis	c) Directrix	d) Minor axis

61) If the intersecting plane is parallel to a generator of the cone, but intersects only one nappe, then curve of intersection is a

a) Circle	b) Hyperbola	c) An ellipse	✔d) Parabola

62) Domain of a constant function is

✔a) R	b) Q	c) N	d) W

63) If $\underline{a}$ and $\underline{b}$ represents the two adjacent sides of a triangle, then area of triangle is

a) $\underline{a}.\underline{b}$	b) $\lvert\underline{b} \times \underline{a}\rvert$	c) $\lvert\underline{a} \times \underline{b}\rvert$	✔d) $\frac{\lvert\underline{a} \times \underline{b}\rvert}{2}$

64) $\hat{k} \times \hat{j} =$

a) $\hat{i}$	✔b) $-\hat{i}$	c) zero	d) 1

65) If m_1 and m_2 are slopes of Perpendicular lines then

a) $m_1 = m_2$	✔b) $m_1 m_2 = -1$	c) $m_1 m_2 = 1$	d) $m_1 \neq m_2$

66) $\int \frac{\cos x}{\sin x \ln \sin x} dx =$

a) $\ln(\sin x) + c$	b) $\ln(\ln \cos x) + c$	✔c) $\ln(\ln \sin x) + c$	d) $\ln(\cos x) + c$

67) In conic the number e is called

a) Focus	b) vertex	✔c) Eccentricity	d) Axes

68) $\int \sqrt{a^2 - x^2}\, dx =$

a) $\frac{x}{2}\sqrt{a^2-x^2} + \frac{a^2}{2}\cos^{-1}\left(\frac{x}{a}\right) + c$	✔b) $\frac{x}{2}\sqrt{a^2-x^2} + \frac{a^2}{2}\text{Sin}^{-1}\left(\frac{x}{a}\right) + c$	c) $\frac{x}{2}\sqrt{a^2+x^2} - \frac{a^2}{2}\sin^{-1}\left(\frac{x}{a}\right) + c$	d) $\frac{x}{2}\sqrt{a^2+x^2} + \frac{a^2}{2}\cos^{-1}\left(\frac{x}{a}\right) + c$

69) Equation of hyperbola with centre $(0, 0)$ focus and vertex $(4, 0)$ is

a) $\frac{x^2}{9} - \frac{y^2}{16} = 1$	b) $\frac{x^2}{9} - \frac{y^2}{27} = 1$	✔c) $\frac{x^2}{16} - \frac{y^2}{20} = 1$	d) $\frac{x^2}{36} - \frac{y^2}{45} = -1$

70) If $90^o < \alpha < 180^o$ then slope of line having inclination α is:

a) Positive	✔b) Negative	c) Undefined	d) None

71) The point of intersection of right bisectors of the sides of a triangle is called

a) Centroid	b) Orthocenter	✔c) Circumcentre	d) In-centre

72) Associated equation of ax + by < c and ax + by > c is:

a) ax + by = 0	✔b) ax + by = c	c) ax + by < c	d) ax + by + c = 0

73) The position of point $(5, 8)$ with respect to the line $2x - 3y + 6 = 0$ is

✔a) Above	b) Below	c) One the line	d) None

74) If $(3, 1)$ and $(5, 1)$ are end points of diameter of a circle. Then coordinates of centre are.

a) $(1, 4)$	b) $(-4, 1)$	✔c) $(4, 1)$	d) $(-4, -1)$

75) A suitable substitution for $\sqrt{a^2 + x^2}$ is

a) x = asec θ	✔b) x = a tan θ	c) x = a sin θ	d) All

76) Unit vector $\hat{u}$ is defined as

a) $\underline{u}\lvert\underline{u}\rvert$	b) $\underline{u} + \lvert\underline{u}\rvert$	✔c) $\frac{\underline{u}}{\lvert\underline{u}\rvert}$	d) $\underline{u} - \lvert\underline{u}\rvert$

77) The line segment joining the mid points of two sides of a triangle is _____ to the third side

✔a) Parallel	b) Perpendicular	c) Coplanar	d) Collinear

78) The endpoints of minor axis of the ellipse are called

a) Vertices	b) Foci	✔c) Convertices	d) All

79) Differentiating sinx w.r.t cotx we get

a) $\cos^2 x \sin x$	✔b) $-\sin^2 x \cos x$	c) $\sin^2 x \cos x$	d) $-\cos^2 x \sin x$

80) An equation of ellipse with centre $(0, 0)$ focus $(0, -3)$ and vertex $(0, 4)$ is

a) $\frac{x^2}{16} + \frac{y^2}{1} = 1$	b) $\frac{x^2}{7} + \frac{y^2}{16} = 1$	c) $\frac{x^2}{16} + \frac{y^2}{25} = 1$	✔d) $\frac{x^2}{16} + \frac{y^2}{7} = 1$

81) ax + by + c = 0 shows a straight line with slope

✔a) $-\frac{a}{b}$	b) $-\frac{b}{a}$	c) $\frac{a}{b}$	d) $\frac{b}{a}$

82) If $\int_{-2}^{1} f(x)\,dx = 5$, $\int_{-2}^{1} g(x)\,dx = 4$ then $\int_{-2}^{1} [2f(x) + 3g(x)]\,dx =$

a) 20	b) 9	✔c) 22	d) 1

83) If $f(x) = \frac{1}{x+3}$, then domain of f^{-1} is

a) R − {−3}	b) R − {−1}	✔c) R − {0}	d) R − {1}

84) An equation of circle passing through A(3, −1), B(0, 1) and having centre at 4x − 3y − 3 = 0 is

✔a) $x^2 + y^2 - 15x - 18y + 17 = 0$	b) $x^2 + y^2 + 15x + 18y + 17 = 0$	c) $x^2 + y^2 + 15x - 18y - 17 = 0$	d) None

85) Every homogeneous second degree equation $ax^2 + 2hxy + by^2 = 0$ represents a pair of

a) circles	b) parabolas	✔c) lines	d) ellipse

86) The magnitude of the position vector of any point P(x, y) is

a) $\sqrt{x^2 - y^2}$	✔b) $\sqrt{x^2 + y^2}$	c) $\sqrt{x^2 y^2}$	d) x^2+y^2

87) The variables used in the system of linear inequalities relating to the problems of every day life are called:

a) Negative constraints	b) Negative coefficients	✔c) Non − negative constraints	d) Problem constraints

88) If the line segment obtained by joining any two points of the region lies entirely within the region, then the region is called:

✔a) Convex	b) Concave	c) Open half−plane	d) None

89) $\int \frac{dx}{\sqrt{x^2 - a^2}} =$

a) $\cosh^{-1}\left(\frac{x}{a}\right) + c$	b) $\sinh^{-1}\left(\frac{x}{a}\right) + c$	✔c) $\ln(x + \sqrt{x^2 - a^2}) + c$	d) both a & b

90) Radius of circle $5x^2 + 5y^2 + 14x + 12y - 10 = 0$ is

a) $\sqrt{85}$	b) $\sqrt{95}$	✔c) $\sqrt{\frac{27}{5}}$	d) $\sqrt{\frac{95}{5}}$

91) If $a^2(1+m^2) - c^2 = 0$ then points of contact of $y = mx + c$ and $x^2 + y^2 = a^3$ are

✔a) Real and coincident	b) Imaginary	c) Real and distinct	d) Unequal

92) $\int \sec^2(ax + b)dx =$

a) $\tan(ax + b) + c$	b) $\frac{\cos(ax + b)}{a} + c$	✔c) $\frac{\tan(ax + b)}{a} + c$	d) $\frac{\cot(ax + b)}{a} + c$

93) An equation of the normal to the circle $x^2 + y^2 = 25$ at (4, 3) is

✔a) 3x − 4y = 0	b) 4x − 3y = 0	c) 4x + 3y = 0	d) 3x + 4y = 0

94) $\frac{d}{dx}(\sinh x) =$

✔a) cosh x	b) − cosh x	c) csch x	d) − sinh x

95) The centre of the circle $(x-1)^2 + (y+3)^2 = 3^2$ is

a) (−1, −3)	b) (−1, 3)	✔c) (1, −3)	d) (1, 3)

96) Derivative of $(3x^{4/3})$ w.r.t x is

a) None	✔b) $4x^{\frac{1}{3}}$	c) $\frac{4}{3}x^{\frac{1}{3}}$	d) $\frac{4}{3}x^{4/3}$

97) If $y = \cos\sqrt{x}$, then $\frac{dy}{dx} =$

a) $\sin\sqrt{x}$	b) $\frac{\sin\sqrt{x}}{2\sqrt{x}}$	✔c) $-\frac{\sin\sqrt{x}}{2\sqrt{x}}$	d) $-\sin\sqrt{x}$

98) $\int (2x+3)^4 dx =$

a) $\frac{(2x+3)^5}{5} + c$	✔b) $\frac{(2x+3)^5}{10} + c$	c) $\frac{(2x+3)^5}{2} + c$	d) $\frac{4(2x+3)^3}{10} + c$

99) The length of Latus rectum of the parabola $y^2 = 8x$ is

a) 2	b) 4	✔c) 8	d) $2\sqrt{2}$

100) Slope intercept from 4x + 7y − 2 = 0 is

a) $\frac{y}{\frac{1}{2}} + \frac{x}{\frac{2}{7}} = 1$	b) $y = \frac{4}{7}x - \frac{2}{7}$	✔c) $y = \frac{-4x}{7} + \frac{2}{7}$	d) y = 4x + 2

101) A function which is to be maximized is called:

a) Maximum function	b) Minimum function	c) Both a and b	✔d) Objective function

102) If $f(x) = \frac{x-1}{x+1}$, then $f(x)$ is

a) Odd function	b) Even function	✔c) Neither even nor odd function	d) Both a and b

103) $\frac{d}{dx}(x+4)^{1/3} =$

a) $\frac{1}{3(x+4)^{-2/3}}$	b) $\frac{2}{3(x+4)^{\frac{1}{3}}}$	c) $\frac{3}{(x+4)^{2/3}}$	✔d) $\frac{1}{3(x+4)^{2/3}}$

104) An equation of tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ at the point (x_1, y_1) is

✔a) $\frac{xx_1}{a^2} - \frac{yy_1}{b^2} = 1$	b) $\frac{xx_1}{a^2} + \frac{yy_1}{b^2} = 1$	c) $\frac{xx_1}{a} - \frac{yy_1}{b}$	d) $\frac{xx_1}{a} + \frac{yy_1}{b} = 1$

105) The coordinates of P in XY − coordinate system are (8, 10) and axes translated through O' (3, 4) then xy − coordinates will be

a) (10, 4)	✔b) (11, 14)	c) (−14, 11)	d) (2, 5)

106) A function f from X to Y is denoted by

a) $f: X \to X$	b) $f: Y \to X$	c) $f: Y \to Y$	✔d) $f: X \to Y$

107) Equation of line with x − intercept: −3 and y − intercept: 4 is

a) 4x − y + 36 = 0	b) 4x + y − 36 = 0	✔c) 4x − 3y + 12 = 0	d) 2y − 3x = 5

108) $\int_0^1 \frac{1}{1+x^2}\,dx =$

a) $\frac{3\pi}{2}$	✔b) $\frac{\pi}{4}$	c) $\frac{3\pi}{4}$	d) zero

109) $\int e^{\sin x}\cos x\,dx =$

a) $\frac{e^{\sin x}}{\cos x} + c$	b) $\sin x\ e^{\sin x - 1} + c$	✔c) $e^{\sin x} + c$	d) $\ln(e^{\sin x}) + c$

110) The nature of point of intersection $3x - y - 4 = 0$ and $x^2 + y^2 = 9$ is

a) Imaginary	✔b) Real and distinct	c) Coincident	d) Rational

111) The ordinate at any point P of the parabola, is a mean proportional between the length of the latus rectum and

a) Diameter	b) Axis	✔c) Abcissa of P	d) Focal chord

112) The line through the centre and perpendicular to the focal axis of hyperbola is called

✔a) Conjugate axis	b) Transverse axis	c) Major axis	d) Minor axis

113) Each point of the feasible region is called a _____ of the system of linear inequalities:

✔a) Feasible solution	b) Solution set	c) Test point	d) Corner point

114) $\int_0^{\frac{\pi}{4}} \sec^2 x\,dx =$

a) ∞	b) 10	c) zero	✔d) 1

115) $x = a\sec\theta$, $y = b\tan\theta$ represent the equation of _____.

✔a) Hyperbola	b) Ellipse	c) Parabola	d) Circle

116) $\int \sqrt{x^2 - a^2}\,dx =$

a) $\frac{x}{2}\sqrt{x^2-a^2} + \frac{a^2}{2}\ln\lvert x+\sqrt{x^2-a^2}\rvert + c$	✔b) $\frac{x}{2}\sqrt{x^2-a^2} - \frac{a^2}{2}\ln\lvert x+\sqrt{x^2-a^2}\rvert + c$	c) $\frac{x}{2}\sqrt{x^2-a^2} - \frac{a^2}{2}\ln\lvert x-\sqrt{x^2-a^2}\rvert + c$	d) none

117) If $y = \left(\sqrt{x} - \frac{1}{\sqrt{x}}\right)^2$ then $\frac{dy}{dx} =$

✔a) $\frac{x^2-1}{x^2}$	b) (x^2+1)	c) $\frac{x^2+1}{x}$	d) $\frac{x-1}{x^2}$

118) If $x = 1 - t^2$ and $y = 3t^2 - 2t^3$ then $\frac{dy}{dx} =$

a) − 3 (t + 1)	b) 3 (t − 1)	✔c) −3 (t − 1)	d) 3 (t + 1)

119) Vertex of the parabola $y^2 = 4x + 4y$ is at

✔a) $(-1,2)$	b) $(1,2)$	c) $(1,-2)$	d) $(-1,-2)$

120) $\frac{e^x + e^{-x}}{e^x - e^{-x}} =$

a) tanhx	✔b) cothx	c) sechx	d) coshx

121) The function $f(x)$ = sin x is increasing in the interval

✔a) $\left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$	b) $\left(\frac{-\pi}{4}, \frac{\pi}{4}\right)$	c) $\left[\frac{-\pi}{6}, \frac{\pi}{6}\right]$	d) $[-\pi, \pi]$

122) Which of the following quantity is vector

✔a) Momentum	b) length	c) Speed	d) Volume

123) $\int e^x (\sin x + \cos x)\, dx$

✔a) $e^x \sin x + c$	b) $e^x \cos x + c$	c) $-e^x \sin x + c$	d) $e^x \sin x \cos x + c$

124) $\int \frac{1}{x}\, dx = ?$

a) $\frac{1}{x^2} + c$	b) $-\frac{1}{x^2} + c$	✔c) $\ln x + c$	d) $\frac{1}{x} + c$

125) The point where parabola meets its axis is called

a) Focus	b) Eccentricity	✔c) Vertex	d) Centre

126) $\int \frac{1}{x^2 + 16}\, dx = ?$

a) $\tan\frac{x}{4} + c$	b) $\frac{1}{4}\tan\frac{x}{4} + c$	✔c) $\frac{1}{4}\tan^{-1}\frac{x}{4} + c$	d) $\tan^{-1}\frac{x}{4} + c$

127) For $x_1, x_2 \in (a, b) f$ is decreasing on the interval (a, b) for $x_2 > x$ if

a) $f(x_1) < f(x_2)$	✔b) $f(x_2) < f(x_1)$	c) $f(x_1) \geq f(x_2)$	d) $f(x_1) \leq f(x_2)$

128) Volume and speed are examples of

a) Vector quantity	✔b) Scalar quantity	c) Constant	d) None

129) A linear inequality concerning the problem from everyday life is named as:

✔a) Problem constraint	b) Problem constraints	c) Non-negative constraints	d) Linear Programming

130) The perpendicular bisector of any chord of a circle passes through the _____ of the circle

a) Radius	b) Diameter	c) Tangent	✔d) Centre

131) $\int \frac{x}{x^2 + 1}\, dx =$

a) $\frac{1}{a}\, tan^{-1}\left(\frac{x}{a}\right) + c$	b) $\ln(x^2 + 1) + c$	c) $\frac{(x^2 + 1)^2}{2} + c$	✔d) $\frac{1}{2}\ln(x^2 + 1) + c$

132) If c $\in$ Df and $f'(c) = 0$ or $f'(c)$ does not exist then the number c is called

a) Absolute value	b) Extreme value	✔c) Critical value	d) none

133) Equation of line bisecting second and forth quadrant is

a) x = y	✔b) x = −y	c) x − y = 1	d) x + y = 1

134) Let $\underline{u}$ and $\underline{v}$ are vectors along two adjacent sides of a parallelogram, so area of parallegram is

a) $\underline{u} \cdot \underline{v}$	b) $\lvert \underline{u}\ \underline{v} \rvert$	✔c) $\lvert \underline{u} \times \underline{v} \rvert$	d) $\lvert \underline{u} - \underline{v} \rvert$

135) If th lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are parallel then

✔a) $a_1b_2 + a_1b_2 \neq 0$	b) $a_1b_2 - a_2b_1 = 0$	c) $a_1b_2 - a_2b_1 = 0$	d) $a_1b_2 + a_2b_1 = 0$

136) The linear function f(x) = ax + b is an identity function if

a) a = 0, b = 1	b) a = 1, b = 1	✔c) a = 1, b = 0	d) $a \neq 0, b = 0$

137) The feasible solution which maximizes or minimizes the objective function is called:

✔a) Optimal solution	b) Feasible solution	c) Objective solution	d) Solution

138) The nature of tangents drawn from (2, 3) to the circle $x^2 + y^2 = 9$ is

a) Coincident	✔b) Real and distinct	c) Imaginary	d) None

139) Measure of the central angle of a minor are is double the measure of angle subtended in the corresponding

✔a) Major arc	b) Circle	c) Segment	d) Sector

140) Corner Points of $2x - 3y \leq 6$ and $2x + 3y \leq 12$ is:

a) $\left(\frac{9}{2}, 4\right)$	✔b) $\left(\frac{9}{2}, 1\right)$	c) $\left(\frac{2}{9}, 1\right)$	d) $\left(\frac{2}{9}, 0\right)$

141) The two separate parts of hyperbola are called its

a) Vertices	✔b) Braches	c) Foci	d) Directrices

142) An expression involving any one of the symbols $<, >, \leq, \geq$

is called:

a) linear equation	✔b) Inequation	c) Identity	d) Equation

143) $\int_0^{\frac{\pi}{3}} \sin 2x\ dx =$

✔a) $\frac{3}{4}$	b) $\frac{4}{3}$	c) 1	d) All are incorrect

144) In equation of ellipse $\frac{x^2}{b^2} + \frac{y^2}{a^2} = 1, (a > b)$ the foci are

✔a) $(0, \pm c)$	b) $(\pm c, 0)$	c) (c, c)	d) $(\pm c, \pm c)$

145) a test point is the point which is _____ of the corresponding equation:

a) On the graph	✔b) Not on the graph	c) Below the graph	d) Above the graph

146) The order of differential equation $2x^2y\frac{dy}{dx} = x^2 - 1$ is

✔a) 1	b) 2	c) 3	d) 4

147) The non − negative constraints are called:

a) Coefficients	b) Solutions	✔c) Decision variables	d) Vertex

148) Gradient of straight line $3y = 2x + 5$ is

✔a) $\frac{2}{3}$	b) $\frac{3}{2}$	c) $\frac{-2}{3}$	d) $\frac{1}{3}$

149) (1, 1) is a solution of the inequality:

✔a) $x + 2y < 6$	b) $x + 2y > 6$	c) $x - 2y > 6$	d) $2x + y < 0$

150) The value of a for which a parabola $y^2 = 4ax$ passes through the point (2, 3) is

✔a) $\frac{9}{8}$	b) $\frac{8}{9}$	c) $\frac{1}{3}$	d) $\frac{-1}{3}$

151) $\frac{d}{dx}(\log_{10} x) =$

✔a) $\frac{1}{x.\ln 10}$	b) $\frac{1}{x.\ln a}$	c) $\frac{\ln 10}{x}$	d) $\frac{1}{x}$

152) Slope of a horizontal line is

✔a) zero	b) 1	c) −1	d) undefined

153) The graph of $x^2 + y^2 = a^2$ is

a) Straight line	✔b) Circle	c) Ellipse	d) Parabola

154) Length of latus − rectum of hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is

✔a) $\frac{2b^2}{a}$	b) $\frac{2b}{a^2}$	c) $\frac{a}{2b^2}$	d) $2a^2$

155) Foci of the hyperbola $\frac{y^2}{16} - \frac{x^2}{9} = 1$

a) $(0, \pm\sqrt{7})$	✔b) $(0, \pm 5)$	c) $(\pm 5, 0)$	d) $(4, 3)$

156) Equation of y − axis is

a) $y = 0$	✔b) $x = 0$	c) $y = a$	d) $x = a$

157) The approximate value of e is

a) 2.8	b) 2.7123	✔c) 2.718281	d) 2.7

158) Angle bisectors of a triangle are

a) parallel	b) Collinear	c) Perpendicular	✔d) Concurrent

159) A line perpendicular to the tangent at the point of tangency is called

✔a) Normal	b) Secant	c) Axis	d) Diameter

160) $\int (e^x + \sec^2 x)dx =$

a) $(e^x + secx) + c$	✔b) $(e^x + \tan x) + c$	c) $e^x + \tan x + c$	d) $e^x + \sec x + c$

161) A line joining two distinct points on a parabola is called a

✔a) Chord	b) Directrix	c) Axis	d) Latusrectum

162) If $f(x) = \sqrt{x^2 - 4}$, then domain of f is `(162

✔a) $(-\infty,-2]\cup[2,+\infty)$	b) $(-\infty,+\infty)$	c) $[-2,2]$	d) $[-3,3]$

163) The unit vector along y − axis is

a) $\hat{k}$	b) $\hat{\imath}$	✔c) $\hat{\jmath}$	d) None

164) If f: $f: X \to Y$ then set X is called

✔a) Domain	b) Range	c) Dependent variable	d) Co-domain

165) The distance of P(2, −1) from x − axis is

a) 2	b) −1	✔c) 1	d) −2

166) (1, 0) is not the solution of inequality:

a) $7x + 2y < 8$	✔b) $x - 3y < 0$	c) $3x + 5y < 7$	d) $3x + 5y < 5$

167) A line that touches the curve at on point is called

a) Secant	b) Radius	c) Directrix	✔d) Tangent

168) If $f(x) = 2 + \sqrt{x-1}$, then range of $f^{-1}(x)$ is

a) $[2,+\infty)$	✔b) $(1,+\infty)$	c) $(-\infty,2)$	d) $[1,+\infty)$

169) The centre of circle $x^2 + y^2 + 12x - 10y = 0$

a) (6, −5)	b) (−6, −5)	✔c) (−6, 5)	d) (6, 5)

170) The line segments formed by joining the mid points of the sides of a quadrilateral taken in order form

a) Trapezium	b) Cube	✔c) Parallelogram	d) Square

171) A second degree equation $ax^2 + by^2 + 2gx + 2fy + c = 0$ represents parabola if

✔a) either a = 0 or b = 0	b) a > b	c) a > 0, b < 0	d) Both a = 0, b = 0

172) The function of $f(x) = \frac{2+3x}{x}$ is not continuous at

a) $x = -\frac{2}{3}$	✔b) x = 0	c) x = 1	d) x = 2

173) If $y = x^2 - 1$, then dy is

✔a) 2xdx	b) (2x − 1) dx	c) 2xdy	d) $(x^2 - 1)\,dx$

174) If $|\alpha\hat{\imath} + (\alpha+1)\hat{\jmath} + 2\hat{k}| = 3$ the $\alpha = ?$

✔a) 1, −2	b) 1, 2	c) −1, −2	d) 1

175) If the length of each edge of a changes from 5 to 5.02 then approximate increase in the volume is

✔a) 1.5 cubic units	b) 1.7 cubic units	c) 2 cubic units	d) 0.5 cubic units

176) ax + b = 0 is/an?

a) Equation	✔b) Inequality	c) Identity	d) linear equation

177) The point (−3, −3) lies in .. quadrant:

a) I	b) II	✔c) III	d) IV

178) The position of the point $(5, 6)$ with respect to the circle $2x^2 + 2y^2 + 12x - 8y + 1 = 0$ is

a) Inside	✔b) Out side	c) On the circle	d) None

179) The solution of $\frac{dy}{dx} = \cos x$ is

a) $y = \cos x + c$	b) $x - y = c$	✔c) $y = \sin x + c$	d) None of these

180) The graph of $f(x) = \log x$ lies in the

a) 1^{st} & 2^{nd} quadrant	✔b) 1^{st} & 4^{th} quadrant	c) 2^{nd} & 3^{rd} quadrant	d) 3^{rd} & 4^{th} quadrant

181) The midpoint of the line segment joining the points $A\left(-\sqrt{5}, -\frac{1}{3}\right), B(-3\sqrt{5}, 5)$ is

a) $\left(-2\sqrt{5}, \frac{14}{3}\right)$	b) $\left(-4\sqrt{5}, \frac{14}{3}\right)$	c) $\left(2\sqrt{5}, \frac{7}{3}\right)$	✔d) $\left(-2\sqrt{5}, \frac{7}{3}\right)$

182) Range of $f(x) = \frac{x}{x^2 - 4}$ is

a) $R = \{-2, 2\}$	b) $R - \{0\}$	c) $R - \{4\}$	✔d) R

183) $\lim_{\delta x \to o} \frac{f(0 + \delta x) - f(0)}{\delta x}$

a) $f(a)$	✔b) $f'(0)$	c) $f'(x)$	d) $f(\delta x)$

184) The centroid of a ΔABC is a point that divides each median in the ratio

✔a) 2 : 1	b) 1 : 2	c) 1 : 3	d) 1 : 4

185) Angles of line passing through $(5, 11)$ and is $(-2, 4)$ with x - axis

✔a) 45^o	b) 135^o	c) 90^o	d) 225^o

186) $\int e^{ax+b}\, dx =$

✔a) $\frac{e^{ax+b}}{a} + c$	b) $\frac{e^{ax+b}}{b} + c$	c) $(ax + b)e^{ax+b-1} + c$	d) $e^{ax+b} + c$

187) If $y = \tan^{-1} x + \cot^{-1} x$ then $\frac{dy}{dx} =$

a) 1	✔b) zero	c) x	d) $\frac{2}{\sqrt{1 - x^2}}$

188) For $b > 0$ the point $p(x_1, y_1)$ lies below the lin $ax + by + x = 0$ if

a) $ax_1 + by_1 + c > 0$	✔b) $ax_1 + by_1 + c < 0$	c) $ax_1 + by_1 + c = 0$	d) $ax_1 + by_1 + c \leq 0$

189) A circle is a special case of an

✔a) Ellipse	b) Hyperbola	c) Parabola	d) None

190) $2 \sinh x \cosh x =$ _____

a) $\cosh 2x$	✔b) $\sin 2x$	c) $\cosh x$	d) $\sinh x$

191) The solution region of the inequalities $x > 0, y . 0$ is:

a) 2nd quadrant	b) 3rd quadrant	c) 4th quadrant	✔d) 1st quadrant

192) If $y = e^{x^2+1}$ then $\frac{dy}{dx}$ =

a) e^{x^2+1}	✔b) $e^{x^2+1}.(2x)$	c) $\frac{e^{x^2+1}}{2x}$	d) e^{x^2}

193) If f(x) = tan x, then $f'(0)$ =

a) zero	b) ∞	✔c) 1	d) −1

194) The location of the poin P(x, y) for which x < 0 and y > 0 is

a) 1st quadrant	✔b) 2nd quadrant	c) 3rd quadrant	d) 4th quadrant

195) A standard from of an equation circle is

a) $(x + h)^2 + (y + k)^2 = r^2$	✔b) $(x - h)^2 + (y - k)^2 = r^2$	c) $(x + h)^2 - (y - k)^2 = r^2$	d) $(x - h)^2 - (y - k)^2 = r^2$

196) If y = 0 then point P(x, y) lies on

a) y − axis	b) x − axis	c) Origin	d) Centre

197) If f(x) = sinx, then $f^n(\pi)$ =

a) ∞	b) −1	c) 1	✔d) zero

198) If y = ln x, then $\frac{dy}{dx}$ =

a) $\frac{\ln x}{x}$	✔b) $\frac{1}{x}$	c) $a^{\ln x}$	d) None

199) (0, 0) is in the solution of inequality:

a) 7x + 2y > 3	b) x − 3y > 0	c) 3x + 5> 7	✔d) 3x + 5y < 7

200) The function $f(x) = (x + 2)^2$ is _____

a) Even function	b) Odd function	c) Both	✔d) Neither even nor odd

201) The graph of the parabola $x^2 = 4ay$

✔a) Opens up	b) Opens down	c) Opens right	d) Open left

202) A point of solution region where two of its boundary lines intersect, is called:

a) Corner point	b) |Vertex	✔c) Both (a) and (b)	d) Stationary point

203) Taylor Series Expansion is only valid if it is

a) Divergent	✔b) Convergent	c) Both a & b	d) Alternating

204) The coordinates of P in xy and XY coordinate system are (−7, −9) and (−5, −3) resp, then coordinates of translated origin are

a) (2, −6)	✔b) (−2, −6)	c) (6, 2)	d) (9, 3)

205) Equation of the directrix of the parabola $y = 6x^2 - 1$ is

✔a) $y = \frac{-25}{24}$	b) $x = \frac{4}{5}$	c) $x = \frac{6}{20}$	d) $y = \frac{14}{15}$

206) If the centre of the circle is the origin then equation of circle is.

a) $x^2 - y^2 = r^2$	✔b) $x^2 + y^2 = r^2$	c) $x^2 + y^2 = r$	d) $y^2 - x^2 = r^2$

207) A set consisting of all the feasible solutions of the system of linear inequality is called a:

a) Solution set	✔b) Feasible solution set	c) Closed half plane	d) Optimal solution set

208) The focus of parabola $y^2 = 8x$

a) (0, 2)	✔b) (2, 0)	c) (0, 0)	d) (2, 2)

209) The lines $4x - y + 2 = 0$ and $12x - 3y + 1 = 0$ are

a) Perpendicular	✔b) Parallel	c) Both perpendicular and parallel	d) None

210) A vector whose magnitude is unity is called

✔a) Unity vector	b) Null vector	c) Point vector	d) Radial vector

211) The dot product is also reffered as

a) Scalar product	b) Inner product	c) Vector product	✔d) Both a and b

212) $ax + by \leq c$ is a linear inequality in:

a) Three variables	✔b) Two variables	c) One variable	d) Four variables

213) $ax + b \geq 0$ is a/an:

a) Equation	✔b) Inequality	c) Linear equation	d) Identity

214) If $f(y) = y^3 + y^2 + y + 1$, then $f(0)=$

a) -1	✔b) 1	c) 2 ~(c	d) 3

215) $\int e^x \left(\ln x + \frac{1}{x}\right) dx =$

a) $\frac{e^x}{x} \ln x + c$	b) $\frac{1}{x} \ln x + c$	✔c) $e^x \ln x + c$	d) $\frac{e}{x} + c$

216) Centre of circle $x^2 + y^2 + 2gx + 2fy + c = 0$

a) (g, f)	b) (x, y)	c) $(-g, f)$	✔d) $(-g, -f)$

217) $\int \sqrt{2x+3}(2dx) =?$

✔a) $\frac{2}{3}(2x+3)^{\frac{3}{2}} + c$	b) $\frac{3}{2}(2x+1)^{\frac{3}{2}} + c$	c) $-\frac{2}{3}(2x+1)^{\frac{3}{2}} + c$	d) $-\frac{3}{2}(2x+1)^{\frac{3}{2}} + c$

218) $\int cot^3 x(-cosec^2 x)\, dx = ?$

a) $\frac{cot^3 x}{3} + c$	b) $-\frac{cot^3 x}{3} + c$	✔c) $\frac{cot^4 x}{4} + c$	d) $-\frac{cot^4 x}{4} + c$

219) The slop of vertical line is

a) 1	b) zero	✔c) undefined	d) -1

220) A joint equation of $y = 2x = 0$ and $y - 3x = 0$ is

✔a) $y^2 - xy - 6x^2 = 0$	b) $6y^2 - xy - x^2 = 0$	c) $x^2 + xy + 6y^2 = 0$	d) $6x^2 + xy + y^2 = 0$

221) The distance between centre and any focus of the ellipse is denoted by c and is given as

✔a) $c = \sqrt{a^2 - b^2}$	b) $c = \sqrt{a^2 + b^2}$	c) $c = \sqrt{b^2 - a^2}$	d) $c^2 = a^2 + b^2$

222) The line joining the centre of a circle to the midpoint of a chord is _____ to the chord

✔a) Perpendicular	b) Parallel	c) Bisector	d) Tangent

223) Equation of the line passing through $(-8, 5)$ having slope undefined is

a) 8y + 5x = 0	✔b) x = −8	c) y = 5	d) 8x = 5y = 12

224) $\int \sin 3\,x dx = ?$

a) $\frac{\cos 3x}{3} + c$	✔b) $-\frac{\cos 3x}{3} + c$	c) $3\cos x + c$	d) $-3\cos 3x + c$

225) A function f is said to be even if

a) $f(x) - f(x) = 0$	b) $f(x) = f(x)^2$	c) $f(x) = -f(x)$	✔d) $f(-x) = f(x)\ \forall x \epsilon D_f$

226) To find the optimal solution we evaluate the objective function at:

✔a) Corner points	b) Only origin	c) Any point	d) All points of feasible region

227) $\int \frac{\sec^2 x}{\tan x} dx$

a) $\frac{\sec^3 x}{3} + c$	✔b) $\ln \lvert \tan x \rvert + c$	c) $\ln \lvert \cot x \rvert + c$	d) $\ln \lvert \sec^2 x \rvert + c$

228) $\frac{d}{dx}\left(\frac{e^x + e^{-x}}{2}\right) =$

a) coshx	✔b) sinhx	c) −sinhx	d) sechx

229) The shortest distance between the lines 12x + 5y − 6 = 0 and 12x + 5y + 12 = 0 is

a) $\frac{7}{13}$	✔b) $\frac{19}{13}$	c) $\frac{5}{\sqrt{8}}$	d) $\frac{10}{19}$

230) x = 5 is the solution of inequality:

✔a) 2x − 3 > 0	b) 2x + 3 < 0	c) x + 4 < 0	d) x + 2 < 0

231) Eccentricity of the ellipse is

✔a) $e = \frac{a}{c}$	b) $e = \frac{c^2}{a^2}$	c) $e = \frac{a^2}{c^2}$	d) $e = \frac{c}{a}$

232) The point at which the line cuts x = axis is called

a) Origin	b) Centre	✔c) x − intercept	d) y − intercept

233) The value of [k i j] is

a) zero	b) −1	✔c) 1	d) 2

234) If y = sin 2x, then $\frac{dy}{dx} =$

✔a) 2cos2x	b) −2sin2x	c) cos2x	d) −2 cos 2x

235) The area bounded by cos function from $\frac{-\pi}{2}$ to $\frac{\pi}{2}$ is

✔a) 2	b) 1	c) 4	d) 10

236) If α, β, γ direction angles of a vector then $\cos\alpha, \cos\beta, \cos\gamma$ are called

a) Direction angles	b) Direction components	✔c) Direction cosines	d) Direction vector

237) The common intersection point of all the generators of cone is called

a) Centroid	b) Apex	c) Vertex	✔d) Both b & c

238) Region which is restricted to the first quadrant is called:

a) Half plane	✔b) Feasible region	c) Solution region	d) Closed plane

239) If $f(x)$ = ln (1 + x) then by Maclaurin Series $f(x)$ =

a) $x + \frac{x^2}{2!} + \frac{x^3}{3!} + \ldots\ldots$	b) $1 + 2x + \frac{4x^2}{2!} + \frac{8x^3}{3!} + \ldots\ldots$	c) $1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \ldots\ldots$	✔d) $x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \ldots$

240) If a = e, then $\log_a$ x is known as

a) Common logarithm	b) General logarithm	✔c) Natural logarithm	d) Exponential function

241) General form of an equation of a circle is

✔a) $x^2 + y^2 + 2gx + 2fy +$ c= 0	b) $x^2 + y^2 - 2gx - 2fy + c =$ 0	c) $x^2 + y^2 + 2gx + 2fy - c =$ 0	d) $x^2 + y^2 + 2gx + 2fy = 0$

242) $\int_a^b f(x)dx =$

a) $-\int_a^b f(x)dx$	b) $\int_b^a f(x)dx$	✔c) $-\int_b^a f(x)dx$	d) All

243) The parabola $x^2 = 4ay$, $a < 0$ opens

a) Right side	b) Upward	✔c) Downward	d) Left side

244) If $\underline{u}, \underline{v}$ and $\underline{w}$ are conterminous edges of a tetrahedron, then its volume

a) $\frac{1}{3}[a.(b \times c)]$	✔b) $\frac{1}{6}[a.(b \times c)]$	c) $\frac{1}{2}[a.(b \times c)]$	d) $\frac{1}{4}[a.(b \times c)]$

245) Equation of normal to hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ at the point (x_1, y_1) is

a) $\frac{a^2x}{x_1} - \frac{b^2y}{y_1} = a^2 - b^2$	✔b) $\frac{a^2x}{x_1} + \frac{b^2y}{y_1} = a^2 + b^2$	c) $\frac{a^2x}{x_1} - \frac{b^2y}{y_1} = a^2 + b^2$	d) $\frac{a^2x}{x_1} + \frac{b^2y}{y_1} = a^2 - b^2$

246) Projection of $\underline{b} = -2\hat{i} - \hat{j} + \hat{k}$ along $\underline{a} = 3\hat{i} + \hat{j} - \hat{k}$ is

✔a) $\frac{-8}{\sqrt{11}}$	b) $\frac{8}{\sqrt{11}}$	c) $\frac{11}{\sqrt{8}}$	d) $\frac{-11}{\sqrt{8}}$

247) Domain and range of a liner functions are

a) Natural numbers	b) Whole numbers	c) Integers	✔d) Set of real numbers

248) The procedure for determining the optimal solution for a problem involving linear constraint is called:

a) Objective function	✔b) Linear programming	c) Convex region	d) Optional solution

249) If y is easily expressed in terms of x, then y is _____ of x

a) Implicit relation	b) Parametric function	c) Linear relation	✔d) Explicit function

250) $\int \frac{1}{\sqrt{1-x^2}} dx = ?$

✔a) $\sin^{-1} x + c$	b) $-\sin^{1-} x + c$	c) $-\cos^{-1} x + c$	d) $\cos^{-1} x + c$

251) The notation Df(x) is used for derivative by

a) Leibniz	b) Newton	c) Lagrange	✔d) Cauchy

252) Two conics will always intersect in at most

a) Two points	b) Three points	✔c) Four points	d) One point

253) $\int \frac{1}{x} dx =$

a) $\ln\left(\frac{1}{x}\right) + c$	b) $\frac{-1}{x^2} + c$	✔c) $\ln\|x\| + c$	d) zero

254) The point of intersection of the lines $x - 2y + 1 = 0$ and $2x - y + 2 = 0$ is

a) $(1, 0)$	b) $(-1, 1)$	✔c) $(-1, 0)$	d) $(0, -1)$

255) Domain of $f(x) = x^2$ is

a) $(-\infty, 0]$	b) $[0, \infty)$	✔c) R	d) $(0, 1]$

256) If $y = \sinh^{-1} x$, then $\frac{dy}{dx} =$

✔a) $\frac{1}{\sqrt{1+x^2}}$	b) $\frac{1}{\sqrt{1-x^2}}$	c) $-\frac{1}{\sqrt{1-x^2}}$	d) $-\frac{1}{\sqrt{1+x^2}}$

257) The function $y = e^{ax}$ is a/an _____ function.

a) Logarithmic	✔b) Exponential	c) Hyperbolic	d) Constant

258) $\int_0^1 \frac{1}{1+x^2} dx = ?$

a) $\frac{\pi}{2}$	b) $\frac{\pi}{3}$	✔c) $\frac{\pi}{4}$	d) π

259) Eccentricity of hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

a) $\frac{\sqrt{a^2-b^2}}{a}$	✔b) $\frac{\sqrt{a^2+b^2}}{a}$	c) $\frac{\sqrt{b^2-a^2}}{a}$	d) $\frac{a}{\sqrt{a^2+b^2}}$

260) If $y = e^{2x}$ then $y_4 = ?$

✔a) $16\, e^{2x}$	b) $8e^{2x}$	c) $4e^{2x}$	d) $2e^{x}$

261) $\int e^{\tan x} \sec x dx = ?$

✔a) $e^{\tan x} + c$	b) $e^{-\tan x} + c$	c) $e^{\cot x} + c$	d) $e^{-\cot x} + c$

262) $\underline{v} = \hat{i} - 3\hat{j} + 4\hat{k}$ and $\underline{w} = a\hat{i} + 9\hat{j} - 12\hat{k}$ are parallel so value of α is

a) zero	✔b) -3	c) 3	d) 10

263) The value of $[2\underline{i}\ \ 3\underline{j}\ \ 4\underline{k}]$ is

a) -9	✔b) 24	c) 9	d) -24

264) The system of linear inequalities involved in the problem concerned are called:

✔a) Problem constraints	b) Solution	c) Coefficients	d) Half plane

265) The line represented by $ax^2 + 2hxy + by^2 = 0$ will be real and coincident if

a) h^2 ? ab	b) $h^2 < ab$	✔c) $h^2 = ab$	d) none

266) The graph of $y^2 = 4ax$ is symmetric about

a) y = axis	✔b) x - axis	c) Both axes	d) Origin

267) length of the vector $2\hat{i} + \hat{j} - 2\hat{k}$ is

a) 4	✔b) 3	c) 2	d) 5