THE GURUKUL INSTITUTE

PLOT 5C, 2ND FLOOR, GANAPATI COMPLEX, SEC-13, OPP. JAIPURIA SCHOOL, VASUNDHARA, GHAZIABAD (U.P)

ASSIGNMENT ON STARIGHT LINE

1. Co- ordinate of the point at a unit distance from the point (2, 0) on the line $y + 4 = (2 - \sqrt{3})x + 2\sqrt{3}$ are :
   a) $\left(\frac{\sqrt{3}+1}{2\sqrt{2}} + 2, \frac{\sqrt{3}-1}{2\sqrt{2}}\right)$ c) $(1 , \sqrt{3} - 2)$
   b) $\left(\frac{\sqrt{3}-1}{2\sqrt{2}} + 2, \frac{\sqrt{3}+1}{2\sqrt{2}}\right)$ d) None of these
2. The point A (2, 1) is translated parallel to the line $x - y = 3$ by a distance 4 units. If its new position A' is in third quadrant then the co-ordinates of A' are :
   a) $(2 + 2\sqrt{2}, 1 + 2\sqrt{2})$ c) $(2 - 2\sqrt{2}, 1 - 2\sqrt{2})$
   b) $(-2 + 2\sqrt{2}, -1 - 2\sqrt{2})$ d) None of these
3. The distance of the point (2,3) from the line $x - 2y + 5 = 0$ measured in a direction parallel to the line $x - 3y = 0$ is
   a) $2\sqrt{10}$ b) $\sqrt{10}$ c) $2\sqrt{5}$ d) None of these
4. Let the algebraic sum of the perpendicular distances from the points (2, 0), (0, 2) and (1, 1) to a variable straight line is zero; then line passes through a fixed point whose co-ordinates are
   a) (1, 1) b) $(-1, -1)$ c) $(1, -1)$ d) $(-1, 1)$
5. If a, b, c are first, third and fifth terms of an A.P. then $ax + by + c = 0$represents a family of lines passing through the point($a \neq 0, b \neq 0, c \neq 0$):
   a) (0,0) b) $(1, -2)$ c) $(-1, 2)$ d) None of these
6. Equation of a different line passing through point of intersection of the lines $x - 2 = 0$ and $y + 1 = 0$ and at a unit distance from the origin is:
   a) $4x + 3y + 5 = 0$ b) $4x - 3y - 5 = 0$ c) $4x - 3y + 5 = 0$ d) $4x + 3y - 5 = 0$
7. The line $(p + 2q)x + (p - 3q)y = p - q$ for different values of p and q passes through the point:
   a) (3/2, 5/2) b) (2/5, 2/5) c) (3/5, 3/5) d) (2/5, 3/5)
8. Equation of the line passing through the point of intersection of the lines $x - y = 1$ and $2x + 3y = 4$ and equidistant from the point (2, -3) and (1, 1) is :
   a) $7x - 2y = 0$ b) $14x + y - 20 = 0$ c) $2x - 2y = 5$ d) None of these
9. That line of the family $p(2x + 3y - 13) + q(x - y + 1) = 0$ which is farthest from the origin is:
   a) $4x + 3y - 17 = 0$ b) $3x + 2y - 12 = 0$ c) $2x + 3y - 13 = 0$ d) None of these
10. For all real values of a and b the lines $(2a + b)x + (a + 3b)y + (b - 3a) = 0$ and $mx + 2y + 6 = 0$ are concurrent . then m =
    a) -2 b) -3 c) -4 d) -5
11. If $4a^2 + 9b^2 - c^2 + 12ab = 0$, then the family of straight lines $ax + by + c = 0$is concurrent at :
    a) (2, 3) b) (1, 2) c) (0, 1) d) None of these
12. If the lines $x = a + m$, $y = -2$and $y = mx$ are concurrent, the least value of $|a|$ is:
    a) 0 b)$\sqrt{2}$ c) $2\sqrt{2}$ d) None of these
13. For what values of α the point (α, 2) lies inside the triangle formed by the lines $x = 0$, $x + y = 4$ and $x - y = 4$:
    a) $0 < \alpha < 2$ b) $0 < \alpha < 4$ c) $2 < \alpha < 4$ d) None of these
14. P(m,n), (where m and n are natural numbers) is any point in the interior of the quadrilateral formed by the pair of lines $xy = 0$ and the two lines $2x + y - 2 = 0$ and $4x - 5y - 20 = 0$. The possible number of positions of the point P is :
    a) Six b) five c) Four d) Eleven
15. If the points (1, 2) and (3, 4) be on the same side of the line $3x - 5y + a = 0$ then:
    a) $7 < a < 11$ b) $b = 7$ c) $a = 11$ d) $a < 7$ or $a > 11$.
16. The incentre of a triangle is (1, 2) and the coordinates of two of its vertices are $(-1, 1)$ and (3, 2). Its inradius is equal to :
    a) 1 b) 2 c) 3 d) None of these
17. The distance between th lines $x + y + 1 = 0$ and $2x + 2y + 5 = 0$ is

a) 3/2 b) $\frac{3\sqrt{2}/}{2}$ c) $\frac{3}{2\sqrt{2}}$ d) 5/2

18. The mid- points D, E, F of the sides BC, CA and AB of a ΔABC are (2, −1), (1, 3) and (−1, −2) respectively. The slope of the altitude through B is :
a) 3 b) – 3 c) 1/3 d) 5/2

19. The orthocenter of the triangle whose sides are given by 3x – 4y+ 5 = 0, x + y – 4 = 0 and 4x + 3y = 10
a) (− 3, −1) b) (1 , −2) c) (3, 1) d) (1, 2)

20. If A(0, 0), B(0,3) and C(4, 0) are the vertices of a triangle then the equation of internal bisector of angle B is given by :
a) 2x + y+ 3 = 0 b) 2x + y – 3 = 0 c) 2x – y + 3 = 0 d) None of these

21. The vertices of a triangle are A (−1, −7), B(5, 3) C(1, 4). The equation of the bisector of angle ABC:
a) X + y + 1 = 0 b) x – y +1 = 0 c) x – 7y + 2 = 0 d) x + 1 = 0

22. Let P = (−1, 0), Q = (0,0) and R = (3, 3√3) be three points. Then the equation of the bisector of the angle PQR is :
a) $\frac{\sqrt{3}}{2}$x + y = 0 b) x + √3 y=0 c) √3x + y = 0 d) x + $\frac{\sqrt{3}}{2}$y = 0

23. The angular bisector of the obtuse angle between the lines y = x and y = 3x is:
a) (√5 – 1)y = (√5 – 3)x c) (3 − √5)y = (√5 −1)x
b) (√5 +1)y = (√5 +3)x d) None of these

24. If the vertices of a ΔABC are A (7, 3), B(0, 2), C (6,0) then 2√2 is the length from C to AB of the
a) Median b) Altitude c) Angular bisector d) None of these

25. If amongst the three lines x + √3y = 0, x + y = 1 and x −√3y = 0, two are equations of two altitudes of an equilateral triangles the centroid of the equilateral triangle is :
a) (0, 0) b) $\left(\frac{\sqrt{3}}{\sqrt{3}-1}, \frac{1}{\sqrt{3}-1}\right)$ c) $\left(\frac{\sqrt{3}}{\sqrt{3}+1}, \frac{1}{\sqrt{3}+1}\right)$ d) None of these

26. If A = (2, 0), B = (0, 3) and C = (6, 6) are the vertices of a triangle ABC, the equation of perpendicular bisector of the line joining the midpoints of AB and AC is :
a) 8x + 4y = 29 b) 8x – 4y – 29= 0 c) 8x – 4y + 29 = 0 d) None of these

27. Shortest distance of bisector of xy = 0 from the point (3, 0) is ;
a) 1 b) 3√2 / 2 c) 1/ √2 d) (2/3)√2

28. The point (a^2, a+1) is a point in the angle between the lines 3x – y + 1 = 0 and x + 2y – 5 = 0 containing the origin. The 'a' belongs to the interval:
a) (1, 3) b) (- 3, 0)∪(1/3, 1) c) (0, 1/3)∪(1, ∞) d) (0, 1/ 3)∪(−∞, −3)

29. The image of the point A(1, 2) by the line mirror y = x is the point B and the image of B by the line mirror y = 0 is the point (α, β), then
a) α = 1, β = −2 b) α= 0, β= 0 c) α= 2, β= −1 d) None of these

30. The coordinates of the image of the origin O with respect to the straight line x + y + 1 = 0 are:
a) (−1/2, −1/2) b) (−2, −2) c) (1, 1) d) (−1, −1)

31. The co-ordinates of the foot of the perpendicular from the point (2, 3) to the line x + 2y = 3 are:
a) (−1, 1) b) (1, −1) c) (1, 1) d) (−1, −1)

32. A ray coming from the point (3, 4) is reflected at point A on the x - axis and then passes through the point (1, 8). The coordinate of point A :
a) (7/3, 0) b) (5, 0) c) (29/3, 0) d) (9/2, 0)

33. A man starts from the point P (−3, 4) and reaches Q(0, 1) touching x – axis at R such that PR + RQ is minimum, then the point R is
a) (3/5, 0) b) (−3/5, 0) c) (−2/5, 0) d) (- 2, 0)

34. On the portion of straight line x + y = 2 which is intercepted between the axes, a square is constructed away from the origin with portion as one of its side. If p is the perpendicular distance of a side of this square from the origin, then the maximum value of p is :
a) 3√2 b) √2 c) 2√2 d) None of these

35. Two consecutive sides of a parallelogram are 3x – y = 1and x + y = 3. If equation to one diagonal is 3x + y = 11, the equation to the other diagonal is :

a) Y – 2 = 0 b) y – 3x =10 c) x – 4 = 0 d) None of these

36. Area of parallelogram formed by the lines y = mx + 1 , y = nx and y = nx + 1equals:
a) $\frac{|m+n|}{(m-n)^2}$ b) $\frac{2}{|m+n|}$ c) $\frac{1}{|m+n|}$ d) $\frac{1}{|m-n|}$
37. Number of integral point (coordinates) in the triangle formed by the vertices (0, 0) (21, 0) and (0,21) is :
a) 231 b) 210 c) 190 d) 171
38. If $x^2 - kxy + y^2 + 2y + 2 = 0$ denotes a pair of straight lines then k =
a) $1/\sqrt{2}$ b) $2\sqrt{2}$ c) $\sqrt{2}$ d) 2
39. The distance between the lines represented by $2x^2 + 4xy + 2y^2 - x - y\ 1 = 0$ is:
a) $3/2\sqrt{2}$ b) $3\sqrt{2}/8$ c) $4/\sqrt{13}$ d) $5/\sqrt{13}$
40. The angle between the lines represented by $y^2 - 2xy \operatorname{cosec} \theta + x^2 = 0$, $0 < \theta \leq \pi/2$, is :
a) $\pi/2$ b) θ c) $(\pi/2) - \theta$ d) None of these
41. If $9x^2 + 2hxy + 4y^2 + 6x + 2fy - 3 = 0$ represents two parallel lines, the distance between them is :
a) $2/\sqrt{3}$ b) $3/\sqrt{13}$ c) $4/\sqrt{13}$ d) $5/\sqrt{13}$
42. If the lines joining the origin to the points of intersection of $y = mx + 1$ and $2x^2 + 3y^2 = 1$ are perpendicular to each other, then m =
a) ± 2 b) $\pm\sqrt{2}$ c) ½ d) $\pm 3/2$
43. The equation of the line passing through the point of intersection of the lines given by the equation $6x^2 + 5xy - 4y^2 + 7x + 13\ y - 3 = 0$ and perpendicular to the line x + y = 10 is:
a) X – y = 0 b) 2x – 2y + 3 = 0 c) x – y + 2 = 0 d) None of these

In the following (82 to 92) one or more than alternatives may be correct

44. If the vertices P, Q, R of a triangle P, Q, R are rational points which of the following points of the triangle PQR (are) always rational point(s)?
a) Centroid b) incentre c) circumcentre d) orthocenter
45. If A(-3, -2) and B(2, 1) are two points in the cartesian plane, which of the following lines divides externally the line segment AB in the ratio 1 : 2.
a) 6x – 3y = 2 b) 3y – 3x – 9 = 0 c) x + y + 13 = 0 d) 2x + y = 18
46. A is the point (1, 1) and any point P on x + y = 4 gives the area of **Δ**PAB = 3 units. If AB is parallel to the given line. Then B is / are:
a) (4, −2) b) (−4, −2) c) (−2, 4) d) None of these
47. ABC is an isosceles triangle such that AB = AC. Equations to AB and BC are 3x – 4y = 2 and 2x+ y = 4 respectively. If AC passes through the point (−2, −1), its equation is :
a) 7x – 24y = 10 b) 7x + 24y +38= 0 c) 3x – 4y +2 = 0 d) 3x + 4y + 10 = 0
48. Line L is perpendicular to 5x – y = 1. The area of triangle formed by the line and coordinates axes is 5.Its equation is :
a) $x + 5y = \sqrt{2}$ b) $x + 5y = 5\sqrt{2}$ c) $x + 5y = -5\sqrt{2}$ d) $x + 5y = -\sqrt{2}$
49. The vertex A of **Δ**ABC is at (3, −2) and the equations to two of its medians are 5x + 3y = 11 and 4x + 3y = 8. The equation to the side BC is:
a) x – 3 = 0 b) y + 4 = 0 c) 2x – 5y = 10 d) 3x + 2y = 7
50. The equation of the straight line passing through the point (2, −1) and making an angle of 45° with 6x + 5y –1 = 0 is:
a) 11x – y – 23 =0 b) 5x – y – 11 = 0 c) x+ 5y + 3 =0 d) x + 11y + 9 =0
51. The diagonals of a parallelogram PQRS are along the lines x + 3y = 4 and 6x – 2y = 7. Then PQRS must be a :
a) Rectangle b) Square c) Cyclic quadrilateral d) Rhombus
52. The pair of straight line $2x^2 + 5xy + 2y^2 - 3y - 2 = 0$ and the pair of straight lines $2x^2 + 5xy + 2y^2 + 9y + 12x + 10 = 0$ enclose a :
a) Rectangle b) Square c) Rhombus d) Cyclic Quadrilateral
53. The equation of the line passing through the point (2,3) such that its segment intercepted by the lines 3x + 4y = 1, 3x + 4y = 5 is of length 1 is :
a) x + 2 = 0 b) x – 2 = 0 c) y + 3 = 0 d) y – 3 = 0

54. The three lines ax + by + c =0, bx + cy + a = 0 and cx + ay + b = 0 are concurrent when:

a) a + b+ c= 0 c) $a^3 + b^3 + c^3 = 3abc$

b) $a^2 + b^2 + c^2 = ab + bc + ca$ d) None of these

55. The incentre of a triangle is (1,2) and the coordinates of two of its vertices are (-1,1) and (3,2). Its inradius is equal to

a) 1 b) 2 c) 3 d)none of these

56. The distance between the lines x+y+1=0 and 2x+2y+5=0 is

a)3/2 b)$3\sqrt{2}/2$ c)$3/2\sqrt{2}$ d)5/2

57. The mid point D, E, F of side BC,CA, and AB of a Δ ABC are (2,-1),(1,3) and (-1,-2) respectively. The slope of the altitude through B is

a)3 b) -3 c)1/3 d) 5/2

58. The orthocenter of the triangle whose sides are given by 3x-4y+5=0, x+y-4=0 and 4x+ 3y=10 is

a) (-3,-1) b)(1, -2) c) (3,1) d) (1,2)

59. If A(0,0),B(0,3),C(4,0) are the vertices of a triangle then equation of an internal bisector of of angle B is given by

a)2x+y+3=0 b)2x+y-3=0 c)2x-y+3=0 d) none of these

60. The vertices of a triangle are A(-1,-7),B(5,1),C(1,4). The equation of the bisector of the angle B is

a)x+y+1=0 b)x-y+1=0 c)x-7y+2=0 d)x+1=0

61. Let P=(-1,0),Q=(0,0),and R=(3,$3\sqrt{3}$) be three points. Then the equation of the bisector of the angle PQR is

a)$\sqrt{3}/2$x+y=0 b)x+$\sqrt{3}$y=0 c)$\sqrt{3}$x+y=0 d)x+$\sqrt{3}/2$y=0

62. The angular bisector of the obtuse angle between the lines y=x and y=3x is

a) $(\sqrt{5}-1)y=(\sqrt{5}-3)$ b) $(\sqrt{5}+1)y=(\sqrt{5}+3)x$

c) $(3-\sqrt{5})y=(\sqrt{5}-1)x$ d) none of these

63. If the vertices of a ΔABC are A(7,3), B(0,2),C(6,0), then $2\sqrt{2}$ is the length from C to AB of the

a) median b) altitude c)angular bisector d)none of these

64. If amongst the three lines x+$\sqrt{3}$y=0, x+y=1 and x-$\sqrt{3}$y=0 , two are equations of two altitude of an equilateral triangles the centroid of the equilateral triangle is

a)(0,0) b)[$\sqrt{3}/(\sqrt{3}-1)$, $1/(\sqrt{3}-1)$] c)[$\sqrt{3}/(\sqrt{3}+1)$, $1/(\sqrt{3}+1)$]

d) None of these

65. If A=(2,0) , B=(0,3),and C=(6,6) are the vertices of a triangle ABC, the equation of perpendicular bisector of the line joining the midpoint of AB and BC is

a)8x+4y=29 b)8x-4y-29=0 c)8x-4y+29=0 d)none of these

66. shortest distance of bisector of xy=0 from the point (3,0) is

a)1 b)$3\sqrt{2}/2$ c)$1/\sqrt{2}$ d)$(2/3)\sqrt{2}$

67. The point (a^2, a+1) is a point in the angle between the lines 3x-y+1=0 and x+2y-5=0 containing the origin. Then "a" belongs to the interval

a) (1,3) b)(-3,0)∪(1/3,1) c)(0,1/3)∪(1,∞) d)(0,1/3)∪(-∞,-3)

68. The image of the point A(1,2) by the line mirror y=x is the point B and the image of the B by the line mirror y=0 is the point (α, β), then

a)$\alpha=1, \beta=-2$ b)$\alpha=0, \beta=0$ c)$\alpha=2, \beta=-1$ d)none of these

69. The coordinates of the image of the origin O with respect to the straight line $x+y+1=0$ are
a)(-1/2, -1/2) b) (-2,-2) c) (1,1) d) (-1,-1)
70. The coordinates of the foot of the perpendicular from the point (2,3) to the line $x+2y=3$ are
a)(-1,`1) b)(1,-1) c) (1,1) d) (-1,-1)

71. A ray coming from the point (3,4) is reflected at point A on the x-axis and then passes through the point (1,8). The coordinates of point A is
a) (7/3,0) b) (5,0) c) (29/3,0) d) (9/2,0)

72. A man starts from the point P(-3,4) and reaches point Q(0,1) touching x axis at R such that PR+RQ is minimum, then the point R is
a) (3/5,0) b) (-3/5,0) c) (-2/5,0) d) (-2,0)

73. On the portion of straight line $x+y=2$ which is intercepted between the axes, a square is constructed away from the origin with portion as one of the its side. If p is the perpendicular distance of a side of this square from the origin, then the maximum value of p is
a)$3\sqrt{2}$ b)$\sqrt{2}$ c)$2\sqrt{2}$ d)none of these

74. Two consecutive sides of a parallelogram are $3x-y=1$ and $x+y=3$. If equation to one diagonal is $3x+y=11$, the equation to the other diagonal is
a)$y-2=0$ b)$y-3x=10$ c)$x-4=0$ d) none of these

75. Area of the parallelogram formed by the lines $y=mx$, $y=mx+1$, $y=nx$ and $y=nx+1$ equals
a)$\frac{|m+n|}{(m-n)^2}$ b)$\frac{2}{|m+n|}$ c)$\frac{1}{|m+n|}$ d)$\frac{1}{|m-n|}$

76. Number of integral point (coordinates) in the triangle formed by the vertices (0,0) (21,0) and (0,21) is
a)231 b)210 c)190 d) 171

77. If $x^2-kxy+y^2+2y+2=0$ denotes a pair of straight lines then k=
a)$1/\sqrt{2}$ b)$2\sqrt{2}$ c)$\sqrt{2}$ d)2

78. The angle between the pair of lines $y^2-2xy\ \mathrm{cosec}\theta+x^2=0, 0<\theta\leq\pi/2$ is
a) $\pi/2$ b)$3/\sqrt{13}$ c) $4/\sqrt{13}$ d)$5/\sqrt{13}$

79. The distance between the lines represented by $2x^2+4xy+2y^2-x-y-1=0$ is
a)$3/2\sqrt{2}$ b)$3\sqrt{2}/8$ c)2 d) none of these

80. If $9x^2+2hxy+4y^2+6x+2fy-3=0$ represents two parallel lines, the distance between them is
a)$2/\sqrt{3}$ b)$3/\sqrt{13}$ c)$4/\sqrt{13}$ d) $5/\sqrt{13}$

81. The equation of the line passing through the point of intersection of the lines given by the equation $6x^2+5xy-4y^2+7x+13y-3=0$ and perpendicular to the line $x+y=10$ is
a)$x-y=0$ b)$2x-2y+3=0$ c)$x-y+2=0$ d) none of these

82. In the lines joining the origin to the point of interaction of $y=mx+1$ and $2x^2+3y^2=1$ are perpendicular to each other, then m=
a)±2 b)$\pm\sqrt{2}$ c)$\pm1/\sqrt{2}$ d)$\pm3/2$

In the following(82 to 92) one or more than one alternatives may be correct

83. If the vertices P,Q,R of a triangle are rational points which of the following points of the triangle PQR(are) always rational point(s)?
a)centroid b)incentre c) circumcentre d)orthocenter

84. If A(-3,-2) and B(2,1) are two points in the Cartesian plane, which of the following lines divides externally the line segment AB in the ratio 1:2
a)6x-3y=2 b)3y-3x-9=0 c)x+y+13=0 d)2x+y=18

85. A is the point P on x+y=4 gives the area of ΔPAB=3 units. If AB is parallel to the given line, Then B is/ are
a)(4,-2) b) (-4,-2) c) (-2,4) d) none of these

86. ABC is an isosceles triangle such that AB=AC. Equation to AB and BC are 3x-4y=2 and 2x+y=4 respectively. If AC passes through the point (-2,-1), its equation is
a)7x-24y=10 b)7x+24y+38=0 c)3x-4y+2=0 d) 3x+4y+10=0

87. Line L is perpendicular to 5x-y=1. The area of triangle formed by the line and coordinates axes is 5. Its equation is
a)$x+5y=\sqrt{2}$ b)$x+5y=5\sqrt{2}$ c)$x+5y=-5\sqrt{2}$ d)$x+5y=-\sqrt{2}$

88. The vertex A of ΔABC is at (3,-2) and the equations to two of its median are 5x+3y=11 and 4x+3y=8. The equation to the side BC is
a)x-3=0 b)y+4=0 c)2x-5y=10 d)3x+2y=7

89. The equation of the straight line passing through the point (2,-1) and making an angle of 45^0 with 6x+5y-1=0 is
a)11x-y-23=0 b)5x-y-11=0 c) x+5y+3=0 d)x+11y+9=0

90.) The diagonals of a parallelogram PQRS are along the lines x+3y=4 and 6x-2y=7. Then PQRS must be
a)rectangle b) square c)cyclic quadrilateral d) rhombus

91. The equation of the line through the points(2,3) such that its segment intercepted by the lines 3x+4y=1 and 3x+4y=5 is of length 1 is
a)x+2=0 b)x-2=0 c)y+3=0 d)y-3=0

92. The pair of straight line $2x^2+5xy+2y^2-3y-2=0$ and the pair of straight lines $2x^2+5xy+2y^2+9y+12x+10=0$ enclose a
a) rectangle b)square c) rhombus d) cyclic quadrilateral

93. The three lines ax+by+c=0,bx+cy+a=0 and cx+ay+b=0 are concurrent when
a) a+b+c=0 b)$a^2+b^2+c^2$= ab+bc+ca c)$a^3+b^3+c^3=3abc$
d) none of these