



10. A second degree homogenous equation in x and y always represents
 (a) A pair of straight lines
 (b) A circle
 (c) A conic section
 (d) None of these
11. If $ax^2 + 2hxy + by^2 = 0$ represents a pair of straight lines, then $\frac{h^2}{ab}$ [MP PET 1991]
 (a) -15 (b) 6
 (c) -10 (d) -4
12. If $ax^2 + 2hxy + by^2 = 0$, then the ratio of slopes of the lines represented by the equation will be
 (a) $\frac{h}{a}$ (b) $\frac{h}{b}$
 (c) $\frac{h}{a+b}$ (d) $\frac{h}{a-b}$
13. The lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ are
 (a) $\frac{h}{a}$ and $\frac{h}{b}$
 (b) $\frac{h}{a+b}$ and $\frac{h}{a-b}$
 (c) $\frac{h}{a}$ and $\frac{h}{b}$
 (d) None of these
14. If the equation $ax^2 + 2hxy + by^2 = 0$ represents two lines and $\frac{h^2}{ab} = 1$, then [CEE 1993; MP PET 1988]
 (a) $a = b$ and $h = a$
 (b) $a = b$ and $h = -a$
 (c) $a = -b$ and $h = a$
 (d) $a = -b$ and $h = -a$
15. The nature of straight lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ is [MP PET 1988]
 (a) Real and coincident (b) Real and different
 (c) Imaginary and different (d) None of the above
16. The equation of the perpendiculars drawn from the origin to the lines $ax + by + c = 0$ represented by the equation $ax^2 + 2hxy + by^2 = 0$ is
 (a) $ax + by + c = 0$ (b) $ax - by + c = 0$
 (c) $ax + by - c = 0$ (d) None of these
17. Which of the following second degree equation represented a pair of straight lines [MP PET 1990]
 (a) $x^2 + y^2 + 2x + 2y + 1 = 0$ (b) $x^2 + y^2 - 2x - 2y + 1 = 0$
 (c) $x^2 + y^2 + 2x - 2y + 1 = 0$ (d) $x^2 + y^2 - 2x + 2y + 1 = 0$
18. The lines $ax + by + c = 0$ and $ax + by + d = 0$ will be coincident, if
 (a) $c = d$ or $c = -d$ (b) $c = d$ or $c = -d$
 (c) $c = d$ or $c = 0$ (d) $c = d$ or $c = 0$
19. If the equation $ax^2 + 2hxy + by^2 = 0$ represents two coincident straight lines passing through the origin, then
 (a) ± 6 (b) ± 12
 (c) ± 18 (d) ± 24
20. If one of the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ be $ax + by + c = 0$, then [UPSEAT 1999]
 (a) $h = ac$ (b) $h = -ac$
 (c) $h = \frac{ac}{2}$ (d) $h = -\frac{ac}{2}$
21. The equation of the lines passing through the origin and parallel to the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$, is
 (a) $ax^2 + 2hxy + by^2 = 0$ (b) $ax^2 - 2hxy + by^2 = 0$
 (c) $ax^2 + 2hxy - by^2 = 0$ (d) $ax^2 - 2hxy - by^2 = 0$
22. The equation $ax^2 + 2hxy + by^2 = 0$ will represent two mutually perpendicular straight lines, if
 (a) $p = 1$ and $q = 2$ or 6 (b) $p = 2$ and $q = 0$ or 6
 (c) $p = 2$ and $q = 0$ or 8 (d) $p = -2$ and $q = -2$ or 8
23. If the equation $ax^2 + 2hxy + by^2 = 0$ represents a pair of straight lines, then [MP PET 1992]
 (a) < 0 (b) $= 0$
 (c) > 0 (d) None of these
24. The equation of the lines passing through the origin and having slopes 3 and $-\frac{1}{3}$ is
 (a) $3x - y = 0$ (b) $3x + y = 0$
 (c) $x - 3y = 0$ (d) $x + 3y = 0$
25. The equation $ax^2 + 2hxy + by^2 = 0$ represents [MP PET 1991]
 (a) A parabola (b) A pair of straight lines
 (c) An ellipse (d) Two parallel straight lines
26. If the slope of one of the line represented by the equation $ax^2 + 2hxy + by^2 = 0$ be λ times that of the other, then
 (a) $h = a\lambda$ (b) $h = b\lambda$
 (c) $h = a\lambda^2$ (d) None of these
27. If one of the line represented by the equation $ax^2 + 2hxy + by^2 = 0$ is coincident with one of the line $ax + by + c = 0$ represented by $ax + by + d = 0$, then
 (a) $c = d$ (b) $c = -d$
 (c) $c = d$ or $c = -d$ (d) None of these



28. The equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ will represent two real parallel straight lines, if
- $g = 4, f = 9, c = 0$
 - $g = 2, f = 3, c = 1$
 - $g = 2, f = 3, c$ is any number
 - $g = 4, f = 9, c > 1$
29. The equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents \dots [MP PET 1992]
- A pair of straight lines
 - A circle
 - An ellipse
 - A parabola
30. One of the lines represented by the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ is
- Parallel to x -axis
 - Parallel to y -axis
 - x -axis
 - y -axis
31. The equation of the lines represented by the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ are
- $ax + by + c = 0$ and $ax + by + c = 0$
 - $ax + by + c = 0$ and $ax + by + c = 0$
 - $ax + by + c = 0$ and $ax + by + c = 0$
 - None of these
32. If the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of straight lines, then
- $ac - h^2 > 0$
 - $ac - h^2 < 0$
 - $ac - h^2 = 0$
 - $ac - h^2 < 0$
33. The equations of the lines represented by the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ are
- $ax + by + c = 0$ and $ax + by + c = 0$
 - $ax + by + c = 0$ and $ax + by + c = 0$
 - $ax + by + c = 0$ and $ax + by + c = 0$
 - None of these
34. The equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents \dots [BIT Ranchi 1991]
- Circle
 - Pair of parallel straight lines
 - Pair of perpendicular straight lines
 - Pair of non-perpendicular intersecting straight lines
35. The equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents \dots [MNR 1991]
- A pair of straight lines
 - A circle
 - A parabola
 - An ellipse
36. If the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents two straight lines, then the value of λ will be \dots [RPET 1989]
- 3
 - 2
 - 8
 - 8
37. The equation of one of the line represented by the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ is
- $ax + by + c = 0$
 - $ax + by + c = 0$
 - $ax + by + c = 0$
 - $ax + by + c = 0$
38. The equation of one of the line represented by the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ is
- $ax + by + c = 0$
 - $ax + by + c = 0$
 - $ax + by + c = 0$
 - $ax + by + c = 0$
39. The pair of straight lines passes through the point (1, 2) and perpendicular to the pair of straight lines $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$, is
- $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$
 - $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$
 - $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$
 - $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$
40. If in general quadratic equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$, $ac - h^2 > 0$ and $bc - f^2 > 0$, then the equation represents
- Two parallel straight lines
 - Two perpendicular straight lines
 - Two coincident lines
 - None of these
41. The condition of representing the coincident lines by the general quadratic equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ is
- $ac - h^2 = 0$ and $bc - f^2 = 0$
 - $ac - h^2 = 0$ and $bc - f^2 = 0$
 - $ac - h^2 = 0$ and $bc - f^2 = 0$
 - $ac - h^2 = 0$ and $bc - f^2 = 0$
42. The equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents two coincident lines, if $k = \dots$ [MP PET 1995]
- 0
 - 1
 - 4
 - 16
43. The joint equation of the straight lines $ax + by + c = 0$ and $ax + by + c = 0$ is \dots [Karnataka CET 1993]
- $ax + by + c = 0$
 - $ax + by + c = 0$
 - $ax + by + c = 0$
 - $ax + by + c = 0$
44. The value of λ for which the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ may represent a pair of straight lines is \dots [Kurukshetra CEE 1996]
- 2
 - 3
 - 4
 - 1
45. The equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ will represent a pair of straight lines, when $\dots = \dots$ [MP PET 1996]
- 2
 - 4
 - 6
 - 8
46. The gradient of one of the lines $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ is twice that of the other, then $h = \dots$ [MP PET 1996]
- $ac - h^2 = 0$
 - $ac - h^2 = 0$
 - $ac - h^2 = 0$
 - $ac - h^2 = 0$



47. If the point $(2, -3)$ lies on _____, then k is equal to
 (a) _____ (b) 16
 (c) 7 (d) 12
48. If _____ represents a pair of straight lines, then L is [MP PET 2001]
 (a) 1 (b) 2
 (c) 3 (d) -1
49. If the ratio of gradients of the lines represented by _____ is $1 : 3$, then the value of the ratio _____ is [MP PET 1998]
 (a) _____ (b) _____
 (c) _____ (d) 1
50. If the slope of one line of the pair of lines represented by _____ is 3 times the slope of the other line, then a is [DCE 1999]
 (a) 1 (b) 2
 (c) 3 (d) 4
51. If the sum of slopes of the pair of lines represented by _____ is equal to the product of the slopes, then the value of h is [Karnataka CET 1999]
 (a) -6 (b) -2
 (c) -4 (d) 4
52. The gradient of one of the lines of _____ is twice that of the other, then [MP PET 2000; Pb. CET 2002]
 (a) _____ (b) _____
 (c) _____ (d) _____
53. The equation _____ represents a pair of straight lines, then k is [MP PET 2000]
 (a) $5/3$ (b) $10/3$
 (c) $3/2$ (d) $3/10$
54. The equation _____ represents a pair of lines. The value of k is [Karnataka CET 2001]
 (a) _____ (b) _____
 (c) _____ (d) _____
55. Separate equations of lines, for a pair of lines, whose equation is _____, are [Karnataka CET 2001; Pb. CET 2000]
 (a) _____ and _____
 (b) _____ and _____
 (c) _____ and _____
 (d) _____ and _____
56. The value of k so that the equation _____ represents a pair of straight lines, is [Kurukshetra CEE 2002]
 (a) 4 (b) 6
 (c) 0 (d) 8
57. If the equation _____ represents a pair of lines, then k is equal to [Karnataka CET 2002]
 (a) 9 (b) 1
 (c) 0 (d) -9
58. Equation _____ represents [UPSEAT 2002]
 (a) Pair of straight line (b) Ellipse
 (c) Hyperbola (d) None of these
59. For what value of _____, _____ represents two straight lines [UPSEAT 2002]
 (a) 2 (b) _____
 (c) _____ (d) _____
60. If the equation _____ represents a pair of lines, then k is equal to [Kerala (Engg.) 2002]
 (a) 4 (b) 2
 (c) 1 (d) -4
61. If the equation _____ represents two straight lines, then the value of k is [MP PET 2003]
 (a) 1 (b) 2
 (c) 0 (d) 3
62. If two sides of a triangle are represented by _____ and the centroid is $(1, 0)$ then the equation of third side is
 (a) _____ (b) _____
 (c) _____ (d) _____
63. The equation _____ represents [Orissa JEE 2003]
 (a) _____ Two parallel lines
 (b) Two perpendicular lines
 (c) Two lines through the origin
 (d) A circle
64. If the slope of one of the lines given by _____ is 5 times the other, then [Karnataka CET 2003]
 (a) _____ (b) _____
 (c) _____ (d) _____
65. The equation to the pair of straight lines through the origin which are perpendicular to the lines _____ is [MP PET 1990]
 (a) _____ (b) _____
 (c) _____ (d) _____



66. The area of the triangle formed by the lines $ax + by + c = 0$ and $bx + cy + a = 0$ is $\frac{1}{2} \sqrt{\frac{c^2(a^2 + b^2)}{a^2 + b^2}}$ and $\frac{1}{2} \sqrt{\frac{a^2(b^2 + c^2)}{b^2 + c^2}}$, is
- (a) $\frac{1}{2} \sqrt{\frac{c^2(a^2 + b^2)}{a^2 + b^2}}$ (b) $\frac{1}{2} \sqrt{\frac{a^2(b^2 + c^2)}{b^2 + c^2}}$
 (c) $\frac{1}{2} \sqrt{\frac{a^2 + b^2}{c^2}}$ (d) $\frac{1}{2} \sqrt{\frac{b^2 + c^2}{a^2}}$
67. If the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ make angles α and β with x -axis, then $\tan \alpha \tan \beta = \frac{b}{a}$ =
- (a) $-\frac{6}{7}$ (b) $\frac{6}{7}$
 (c) $\frac{7}{6}$ (d) $-\frac{7}{6}$
68. Difference of slopes of the lines represented by equation $ax^2 + 2hxy + by^2 = 0$ is $\frac{2\sqrt{h^2 - ab}}{a + b}$ is
- [Kurukshestra CEE 2002]
 (a) 4 (b) 3
 (c) 2 (d) None of these
69. The value of $\frac{a^2 + b^2}{c^2}$ for which the equation $ax^2 + 2hxy + by^2 = 0$ represent a pair of straight line, are
- [MP PET 2004]
 (a) 3, -3 (b) -3, 1
 (c) 3, 1 (d) -1, 1
70. If $\frac{a^2 + b^2}{c^2} = 4$ represents a pair of lines then $\frac{a}{b} = \frac{c}{a}$
- [Karnataka CET 2004]
 (a) -16 (b) 16
 (c) 4 (d) -4
71. If one of the lines given by $ax^2 + 2hxy + by^2 = 0$ is $ax + by + c = 0$ is, then c equals
- [AIIEEE 2004]
 (a) -3 (b) -1
 (c) 3 (d) 1
72. If the sum of the slopes of the lines given by $ax^2 + 2hxy + by^2 = 0$ is four times their product, then c has the value
- [AIIEEE 2004]
 (a) -2 (b) -1
 (c) 2 (d) 1
73. If $ax^2 + 2hxy + by^2 = 0$ represent pair of straight lines and slope of one line is twice the other. Then $\frac{a}{b} = \frac{c}{a}$ is
- [DCE 2005]
 (a) 9 : 8 (b) 8 : 9
 (c) 1 : 2 (d) 2 : 1
- (a) $\frac{1}{2} \sqrt{\frac{c^2(a^2 + b^2)}{a^2 + b^2}}$ (b) $\frac{1}{2} \sqrt{\frac{a^2(b^2 + c^2)}{b^2 + c^2}}$
 (c) $\frac{1}{2} \sqrt{\frac{a^2 + b^2}{c^2}}$ (d) None of these
3. If the acute angles between the pairs of lines $ax^2 + 2hxy + by^2 = 0$ and $bx^2 + 2h'xy + cy^2 = 0$ be α and β respectively, then $\tan \alpha \tan \beta = \frac{b}{a}$
- (a) $\frac{1}{2} \sqrt{\frac{c^2(a^2 + b^2)}{a^2 + b^2}}$ (b) $\frac{1}{2} \sqrt{\frac{a^2(b^2 + c^2)}{b^2 + c^2}}$
 (c) $\frac{1}{2} \sqrt{\frac{a^2 + b^2}{c^2}}$ (d) None of these
4. The angle between the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ will be $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$, if
- (a) $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ (b) $\frac{1}{2} \tan^{-1} \frac{2h}{a+b}$
 (c) $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ (d) None of these
5. The lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ are
- (a) Parallel (b) Coincident
 (c) Perpendicular (d) None of these
6. Acute angle between the lines represented by $ax^2 + 2hxy + by^2 = 0$ is $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ [MP PET 1992]
- (a) $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ (b) $\frac{1}{2} \tan^{-1} \frac{2h}{a+b}$
 (c) $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ (d) None of these
7. Angles made by the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ with x axis are α and β
- (a) α and β (b) α and $\frac{\pi}{2} - \alpha$
 (c) α and $\frac{\pi}{2} - \beta$ (d) α and β
8. If the angle between the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ be α , then $\frac{a}{b} = \frac{c}{a}$
- (a) 0 (b) 1
 (c) 2 (d) 1
9. The angle between the lines $ax^2 + 2hxy + by^2 = 0$ is $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ [MP PET 1990, 92]
- (a) $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ (b) $\frac{1}{2} \tan^{-1} \frac{2h}{a+b}$
 (c) $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ (d) $\frac{1}{2} \tan^{-1} \frac{2h}{a+b}$
10. The angle between the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ are α and β [MP PET 1990]
- (a) α and β (b) α and $\frac{\pi}{2} - \alpha$
 (c) α and $\frac{\pi}{2} - \beta$ (d) α and β

Angle between the pair of straight lines, Condition for parallel and perpendicular lines

1. If the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ make angles α and β with the x -axis, then $\tan \alpha \tan \beta = \frac{b}{a}$ =
- (a) $\frac{1}{2} \sqrt{\frac{c^2(a^2 + b^2)}{a^2 + b^2}}$ (b) $\frac{1}{2} \sqrt{\frac{a^2(b^2 + c^2)}{b^2 + c^2}}$
 (c) $\frac{1}{2} \sqrt{\frac{a^2 + b^2}{c^2}}$ (d) None of these
2. Angle between the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ is $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$
- (a) $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ (b) $\frac{1}{2} \tan^{-1} \frac{2h}{a+b}$
11. If the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ make angles α and β with x -axis, then $\tan \alpha \tan \beta = \frac{b}{a}$ =
- (a) 0 (b) 3/2
 (c) 7/4 (d) 5/4
12. Angle between the line joining the origin to the points of intersection of the curves $ax^2 + 2hxy + by^2 = 0$ and $cx^2 + 2h'xy + cy^2 = 0$ is $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$
- (a) $\frac{1}{2} \tan^{-1} \frac{2h}{a-b}$ (b) $\frac{1}{2} \tan^{-1} \frac{2h}{a+b}$



- (c) (d) None of these
13. The lines _____ and _____ form _____
 (a) An isosceles triangle (b) A right angled triangle
 (c) An equilateral triangle (d) None of these
14. The angle between the lines represented by the equation _____, is _____
 (a) _____ (b) _____
 (c) _____ (d) _____
15. If the sum of the slopes of the lines represented by the equation _____ be 4, then _____
 (a) _____ (b) _____
 (c) _____ (d) _____
16. If _____, then the angle between the lines represented by _____ is _____
 (a) _____ (b) _____
 (c) _____ (d) _____
17. The angle between the lines represented by the equation _____ is _____
 (a) _____ (b) _____
 (c) _____ (d) _____
18. The straight lines joining the origin to the points of intersection of the line _____ and curve _____ include an angle _____ [MP PET 1993]
 (a) $\pi/2$ (b) $\pi/3$
 (c) $\pi/4$ (d) $\pi/6$
19. The angle between the pair of straight lines _____, is _____ [MNR 1983]
 (a) _____ (b) _____
 (c) _____ (d) _____
20. The angle between the pair of lines given by equation _____, is _____ [MNR 1990]
 (a) $\pi/3$ (b) $\pi/6$
 (c) $\pi/2$ (d) 0
21. The angle between the pair of straight lines _____, is _____ [MNR 1991; UPSEAT 2000]
 (a) _____ (b) _____
 (c) _____ (d) _____
22. If the angle between the two lines represented by _____ is _____, then _____ [MNR 1993]
 (a) $1/5$ (b) 1
 (c) $7/5$ (d) 7
23. Pair of straight lines perpendicular to each other represented by _____ [Roorkee 1990]
 (a) _____ (b) _____
 (c) _____ (d) _____
24. If the lines _____ are mutually perpendicular, then _____
 (a) _____ (b) _____
 (c) _____ (d) p and q may have any value
25. Which of the equation represents the pair of perpendicular straight lines _____
 (a) _____ (b) _____
 (c) _____ (d) _____
26. The lines represented by the equation _____, are _____
 (a) Perpendicular to each other
 (b) Parallel
 (c) Inclined at _____ to each other
 (d) None of these
27. If two of the three lines represented by the equation _____ are perpendicular, then _____
 (a) _____ (b) _____
 (c) _____ (d) _____
28. If in general quadratic equation _____ and _____, then the equation represents _____
 (a) Two parallel straight lines
 (b) Two perpendicular straight lines
 (c) Two lines passing through origin
 (d) None of these
29. The angle between the lines represented by the equation _____, is _____
 (a) _____ (b) _____
 (c) _____ (d) None of these
30. The angle between the lines represented by the equation _____ is given by _____ [RPET 1995]
 (a) _____ (b) _____
 (c) _____ (d) _____



31. The equation $ax^2 + 2hxy + by^2 = 0$ represents a pair of perpendicular lines, if
 (a) $a + b = 0$ (b) $a - b = 0$
 (c) $a^2 + b^2 = 0$ (d) None of these
32. The angle between the pair of lines $ax^2 + 2hxy + by^2 = 0$ is θ . [EAMCET 1994]
 (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$
 (c) 0 (d) $\frac{\pi}{2}$
33. The straight lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ are
 (a) Coincident (b) Perpendicular
 (c) Parallel (d) Inclined at an angle of 45°
34. The angle between the two straight lines $ax^2 + 2hxy + by^2 = 0$ is θ .
 (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$
 (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$
35. The acute angle formed between the lines joining the origin to the points of intersection of the curves $ax^2 + 2hxy + by^2 = 0$ and $cx^2 + 2dxy + ey^2 = 0$ is θ . [MP PET 1998]
 (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$
 (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$
36. The angle between the lines given by $ax^2 + 2hxy + by^2 = 0$ is θ . [MP PET 1999]
 (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$
 (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$
37. Condition that the two lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ to be perpendicular is $a + b = 0$. [Kurukshetra CEE 1998; MP PET 2001]
 (a) $a + b = 0$ (b) $a - b = 0$
 (c) $a^2 + b^2 = 0$ (d) $a^2 - b^2 = 0$
38. The equation $ax^2 + 2hxy + by^2 = 0$ represents a pair of perpendicular lines. Then the value of 'a' is -19 . [Karnataka CET 2001]
 (a) -19 (b) -19
 (c) -12 (d) 12
39. The angle between the lines $ax^2 + 2hxy + by^2 = 0$ is θ . [Karnataka CET 2001; Pb. CET 2001]
 (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$
 (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$
40. If the equation $ax^2 + 2hxy + by^2 = 0$ represents a pair of perpendicular straight lines, then $a + b = 0$. [Kurukshetra CEE 2002]
 (a) $a + b = 0$ (b) $a - b = 0$
 (c) $a^2 + b^2 = 0$ (d) $a^2 - b^2 = 0$
41. The angle between the pair of lines represented by $ax^2 + 2hxy + by^2 = 0$ is θ . [Kurukshetra CEE 2002]
 (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$
 (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$
42. If the angle θ is acute, then the acute angle between the lines is $\frac{\pi}{2} - \theta$. [EAMCET 2002]
 (a) $\frac{\pi}{2} - \theta$ (b) θ
 (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{6}$
43. If the angle between the pair of straight lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ is θ , where θ is a non negative real number. Then $\cos 2\theta = \frac{a-b}{a+b}$. [Orissa JEE 2002]
 (a) 2 (b) 0
 (c) 3 (d) 1
44. The angle between the lines $ax^2 + 2hxy + by^2 = 0$ is θ . [Karnataka CET 2003]
 (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$
 (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{6}$

Bisectors of the angle between the lines, Point of intersection of the lines

1. The line $ax + by + c = 0$ will be a bisector of the angle between the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$, if
 (a) $1/2$ (b) 2
 (c) $-1/2$ (d) $-1/2$
2. The equation of the bisectors of the angle between lines represented by equation $ax^2 + 2hxy + by^2 = 0$ is $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$.
 (a) $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$ (b) $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$
 (c) $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$ (d) $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$
3. The equation of the bisectors of angle between the lines represented by equation $ax^2 + 2hxy + by^2 = 0$ is $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$.
 (a) $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$ (b) $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$
 (c) $(a-b)x^2 + 2hxy + (b-a)y^2 = 0$ (d) None of these



4. The equation of the bisectors of the angle between the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$, is
- (a) $\frac{ax^2 + by^2}{2hxy}$ (b) $\frac{2hxy}{ax^2 + by^2}$
 (c) $\frac{ax^2 - by^2}{2hxy}$ (d) None of these
5. If $ax^2 + 2hxy + by^2 = 0$ be one of the bisectors of the angle between the lines $ax + by = c$, then
- (a) $ax^2 + by^2 = 2hxy$
 (b) $ax^2 - by^2 = 2hxy$
 (c) $ax^2 + by^2 = -2hxy$
 (d) $ax^2 - by^2 = -2hxy$
6. The combined equation of bisectors of angles between coordinate axes, is
- (a) $x^2 + y^2 = 0$ (b) $x^2 - y^2 = 0$
 (c) $xy = 0$ (d) $x^2 + y^2 = 2xy$
7. If the bisectors of the angles between the pairs of lines given by the equation $ax^2 + 2hxy + by^2 = 0$ and $ax^2 + 2h'xy + by^2 = 0$ be coincident, then
- (a) $a = a'$ (b) $b = b'$
 (c) $h = h'$ (d) Any real number
8. The combined equation of the bisectors of the angle between the lines represented by $ax^2 + 2hxy + by^2 = 0$ is
- [MP PET 1992]
- (a) $\frac{ax^2 + by^2}{2hxy}$ (b) $\frac{2hxy}{ax^2 + by^2}$
 (c) $\frac{ax^2 - by^2}{2hxy}$ (d) $\frac{2hxy}{ax^2 - by^2}$
9. The equation of the bisectors of the angles between the lines represented by $ax^2 + 2hxy + by^2 = 0$, is
- (a) $\frac{ax^2 + by^2}{2hxy}$ (b) $\frac{2hxy}{ax^2 + by^2}$
 (c) $\frac{ax^2 - by^2}{2hxy}$ (d) None of these
10. If the bisectors of angles represented by $ax^2 + 2hxy + by^2 = 0$ and $a'x^2 + 2h'xy + b'y^2 = 0$ are same, then
- (a) $ax^2 + by^2 = 2hxy$ (b) $a'x^2 + b'y^2 = 2h'xy$
 (c) $ax^2 + by^2 = 2hxy$ (d) $a'x^2 + b'y^2 = 2h'xy$
11. If $ax^2 + 2hxy + by^2 = 0$, then a bisector of the angle between the lines represented by the equation $ax + by = c$, is
- (a) $ax^2 + by^2 = 2hxy$ (b) $ax^2 - by^2 = 2hxy$
 (c) $ax^2 + by^2 = -2hxy$ (d) $ax^2 - by^2 = -2hxy$
12. If the equation $ax^2 + 2hxy + by^2 = 0$ has the one line as the bisector of angle between the coordinate axes, then

[Bihar CEE 1990]

- (a) $ax^2 + by^2 = 2hxy$ (b) $ax^2 - by^2 = 2hxy$
 (c) $ax^2 + by^2 = -2hxy$ (d) $ax^2 - by^2 = -2hxy$
13. If the bisectors of the angles of the lines represented by $ax^2 + 2hxy + by^2 = 0$ and $a'x^2 + 2h'xy + b'y^2 = 0$ are same, then the angle made by the lines represented by first with the second, is
- (a) $\frac{ax^2 + by^2}{2hxy}$ (b) $\frac{2hxy}{ax^2 + by^2}$
 (c) $\frac{ax^2 - by^2}{2hxy}$ (d) $\frac{2hxy}{ax^2 - by^2}$
14. One bisector of the angle between the lines given by $ax^2 + 2hxy + by^2 = 0$ is $ax + by = c$. The other bisector is
- (a) $ax^2 + by^2 = 2hxy$ (b) $ax^2 - by^2 = 2hxy$
 (c) $ax^2 + by^2 = -2hxy$ (d) $ax^2 - by^2 = -2hxy$
15. The point of intersection of the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ is
- (a) (0, 2) (b) (1, 2)
 (c) (-2, 0) (d) (-2, 1)
16. The point of intersection of the lines represented by equation $ax^2 + 2hxy + by^2 = 0$ is
- (a) (2, 2) (b) (-2, -2)
 (c) (-2, 2) (d) (2, -2)

Equation of lines joining the origin to the point of intersection of a curve and a line and Distance between the pair of lines

1. The lines joining the origin to the points of intersection of the curves $ax^2 + 2hxy + by^2 = 0$ and $ax + by = c$ will be mutually perpendicular, if
- [UPSEAT 1999]
- (a) $ax^2 + by^2 = 2hxy$ (b) $ax^2 - by^2 = 2hxy$
 (c) $ax^2 + by^2 = -2hxy$ (d) $ax^2 - by^2 = -2hxy$
2. Distance between the lines represented by the equation $ax^2 + 2hxy + by^2 = 0$ is
- [Roorkee 1989]
- (a) $\frac{5}{2}$ (b) $\frac{5}{4}$
 (c) 5 (d) 0
3. If the lines joining origin to the points of intersection of the line $ax + by = c$ and the curve $ax^2 + 2hxy + by^2 = 0$ be mutually perpendicular, then
- (a) $ax^2 + by^2 = 2hxy$ (b) $ax^2 - by^2 = 2hxy$
 (c) $ax^2 + by^2 = -2hxy$ (d) may have any value
4. The equation of the line joining origin to the points of intersection of the curve $ax^2 + 2hxy + by^2 = 0$ and $ax + by = c$ is
- (a) $ax^2 + by^2 = 2hxy$ (b) $ax^2 - by^2 = 2hxy$
 (c) $ax^2 + by^2 = -2hxy$ (d) $ax^2 - by^2 = -2hxy$



5. The equation of second degree $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ represents a pair of straight lines. The distance between them is $\frac{2\sqrt{h^2 - ab}}{a+b}$. [MNR 1984; UPSEAT 2000]
- (a) 4 (b) $\frac{2\sqrt{h^2 - ab}}{a+b}$
 (c) 2 (d) $\frac{2\sqrt{h^2 - ab}}{a-b}$
6. The equation of pair of straight lines joining the point of intersection of the curve $x^2 + y^2 - 4x - 6y + 13 = 0$ and the line $x + y - 1 = 0$ to the origin, is
- (a) $2x^2 + 2y^2 - 4x - 6y + 13 = 0$ (b) $x^2 + y^2 - 4x - 6y + 13 = 0$
 (c) $x^2 + y^2 - 2x - 3y + 6.5 = 0$ (d) $x^2 + y^2 - 2x - 3y + 13 = 0$
7. The lines joining the points of intersection of line $2x + 3y = 1$ and curve $x^2 + y^2 = 1$ to the origin are perpendicular, then the value of k will be
- (a) $1/2$ (b) $-1/2$
 (c) $1/3$ (d) 0
8. The lines joining the points of intersection of curve $x^2 + y^2 = 1$ and the line $2x + 3y = 1$ to the origin, makes the angles with the axes
- (a) $\tan^{-1} 2$ and $\tan^{-1} 3$ (b) $\tan^{-1} 3$ and $\tan^{-1} 2$
 (c) Equal (d) Parallel to axes
9. The lines joining the points of intersection of the curve $x^2 + y^2 = 1$ and the line $2x + 3y = 1$ to the origin are perpendicular, then
- (a) $2x^2 + 3y^2 - 4x - 6y + 13 = 0$ (b) $x^2 + y^2 - 4x - 6y + 13 = 0$
 (c) $x^2 + y^2 - 2x - 3y + 6.5 = 0$ (d) $x^2 + y^2 - 2x - 3y + 13 = 0$
10. If the distance of two lines passing through origin from the point $(1, 1)$ is $\frac{1}{\sqrt{2}}$, then the equation of lines is
- (a) $x + y = 1$
 (b) $x - y = 1$
 (c) $x + y = 2$
 (d) $x - y = 2$
11. The lines joining the origin to the points of intersection of the line $2x + 3y = 1$ and the curve $x^2 + y^2 = 1$, are
- (a) Parallel to each other
 (b) Perpendicular to each other
 (c) Inclined at 45° to each other
 (d) None of these
12. The distance between the parallel lines $2x + 3y = 1$ and $2x + 3y = 7$ is $\frac{2\sqrt{13}}{13}$. [EAMCET 1994]
- (a) $\frac{2\sqrt{13}}{13}$ (b) $\frac{2\sqrt{13}}{13}$
 (c) $\frac{2\sqrt{13}}{13}$ (d) $\frac{2\sqrt{13}}{13}$
13. Two lines are given by $ax + by + c = 0$ and $ax + by + d = 0$. The value of k so that the distance between them is 3, is
- (a) $\frac{3|c-d|}{\sqrt{a^2+b^2}}$ (b) $\frac{3|c-d|}{\sqrt{a^2+b^2}}$
 (c) $\frac{3|c-d|}{\sqrt{a^2+b^2}}$ (d) None of these
14. The pair of straight lines joining the origin to the points of intersection of the line $2x + 3y = 1$ and the circle $x^2 + y^2 = 1$ are at right angles, if $k = \frac{1}{2}$. [MP PET 1996]
- (a) $\frac{1}{2}$ (b) $\frac{1}{2}$
 (c) $\frac{1}{2}$ (d) $\frac{1}{2}$
15. The equation $2x^2 + 3y^2 - 4x - 6y + 13 = 0$ represents a pair of straight lines. The distance between them is $\frac{2\sqrt{h^2 - ab}}{a+b}$. [UPSEAT 2001]
- (a) $\frac{2\sqrt{h^2 - ab}}{a+b}$ (b) $\frac{2\sqrt{h^2 - ab}}{a+b}$
 (c) $\frac{2\sqrt{h^2 - ab}}{a+b}$ (d) None of these
16. Distance between the pair of lines represented by the equation $2x^2 + 3y^2 - 4x - 6y + 13 = 0$ is $\frac{2\sqrt{h^2 - ab}}{a+b}$. [Kerala (Engg.) 2002]
- (a) $\frac{2\sqrt{h^2 - ab}}{a+b}$ (b) $\frac{2\sqrt{h^2 - ab}}{a+b}$
 (c) $\frac{2\sqrt{h^2 - ab}}{a+b}$ (d) $\frac{2\sqrt{h^2 - ab}}{a+b}$
17. The equation of pair of lines joining origin to the points of intersection of $2x + 3y = 1$ and $x^2 + y^2 = 1$ is $2x^2 + 3y^2 - 4x - 6y + 13 = 0$. [MP PET 2004]
- (a) $2x^2 + 3y^2 - 4x - 6y + 13 = 0$ (b) $x^2 + y^2 - 4x - 6y + 13 = 0$
 (c) $x^2 + y^2 - 2x - 3y + 6.5 = 0$ (d) $x^2 + y^2 - 2x - 3y + 13 = 0$
18. The distance between the pair of parallel lines $2x + 3y = 1$ and $2x + 3y = 7$ is $\frac{2\sqrt{13}}{13}$. [Karnataka CET 2005]
- (a) $\frac{2\sqrt{13}}{13}$ (b) $\frac{2\sqrt{13}}{13}$
 (c) $\frac{2\sqrt{13}}{13}$ (d) $\frac{2\sqrt{13}}{13}$
1. The equation of the locus of foot of perpendiculars drawn from the origin to the line passing through a fixed point (a, b) , is $x^2 + y^2 = a^2 + b^2$.
- (a) $x^2 + y^2 = a^2 + b^2$ (b) $x^2 + y^2 = a^2 + b^2$
 (c) $x^2 + y^2 = a^2 + b^2$ (d) None of these
2. The orthocentre of the triangle formed by the lines $2x + 3y = 1$ and $x^2 + y^2 = 1$ is $(\frac{1}{2}, \frac{1}{2})$. [IIT 1995]



- (a) (b)
- (c) (d)
3. The product of perpendiculars drawn from the origin to the lines represented by the equation _____, will be _____ [Bihar CEE 1994]
- (a) (b)
- (c) (d)
4. The equations to a pair of opposite sides of a parallelogram are _____ and _____. The equations to its diagonals are _____ [IIT 1994; Pb. CET 2003]
- (a) and
- (b) and
- (c) and
- (d) and
5. Area of the triangle formed by the lines _____ and _____ is _____
- (a) _____ units (b) _____ units
- (c) _____ units (d) None of these
6. If the pair of straight lines given by _____, _____ forms an equilateral triangle with line _____, then _____ is _____ [EAMCET 2003]
- (a) (b)
- (c) (d)
7. The area (in square units) of the quadrilateral formed by the two pairs of lines _____ and _____ is _____ [EAMCET 2003]
- (a) (b)
- (c) (d)
8. The locus of the point _____ satisfying the relation _____ is _____ [Orissa JEE 2002]
- (a) Straight line (b) Pair of straight lines
- (c) Circle (d) Ellipse
9. The square of distance between the point of intersection of the lines _____ represented by _____ the equation _____ and origin, is _____
- (a) (b)
- (c) (d) None of these
10. The equation of the pair of straight lines, each of which makes an angle _____ with the line _____, is _____ [MP PET 1990]
- (a)
- (b)
- (c)
- (d)
11. If the bisectors of the lines _____ be _____ then _____ [MP PET 1993; DCE 1999; RPET 2003; AIEEE 2003; Kerala (Engg.) 2005]
- (a) (b)
- (c) (d)
12. The angle between the pair of straight lines _____ is _____ [MNR 1985; UPSEAT 2000; Kerala (Engg.) 2005]
- (a) (b)
- (c) (d) None of these
13. The pair of lines represented by _____ are perpendicular to each other for _____ [AIEEE 2002]
- (a) Two values of (b)
- (c) For one value of (d) For no value of
14. The figure formed by the lines _____ and _____ is _____ [Roorkee 1980]
- (a) A right angled triangle (b) An isosceles triangle
- (c) An equilateral triangle (d) None of these
15. The equation _____ when _____ is a real number, represents a pair of straight lines. If _____ is the angle between the lines, then _____ = _____ [EAMCET 1992]
- (a) 3 (b) 9
- (c) 10 (d) 100
16. If one of the lines of the pair _____ bisects the angle between positive directions of the axes, then a, b, h satisfy the relation _____ [Roorkee 1992]
- (a) (b)
- (c) (d)



17. The lines joining the origin to the points of intersection of the line _____ and the circle _____ will be mutually perpendicular, if _____ [Roorkee 1977]

- (a) _____ (b) _____
- (c) _____ (d) _____

18. The angle between the lines joining the points of intersection of line _____ and the curve _____ to the origin, is _____

- (a) _____ (b) _____
- (c) _____ (d) _____

19. If the lines _____ represents the adjacent sides of a parallelogram, then the equation of second diagonal if one is _____, will be _____

- (a) _____ (b) _____
- (c) _____ (d) None of these

20. If the pair of lines _____ lie along diameters of a circle and divide the circle into four sectors such that the area of one of the sectors is thrice the area of another sector then _____ [AIIEEE 2005]

- (a) _____ (b) _____
- (c) _____ (d) _____

21. The equation of the pair of straight lines parallel to x -axis and touching the circle _____

[Kerala (Engg.) 2002]

- (a) _____ (b) _____
- (c) _____ (d) _____

22. Two of the lines represented by the equation _____ will be perpendicular, then _____ [Kurukshehra CEE 1998]

- (a) _____ (b) _____
- (c) _____ (d) _____

23. The lines represented by the equation _____ will be equidistant from the origin, if _____

- (a) _____ (b) _____
- (c) _____ (d) _____

24. The circumcentre of the triangle formed by the lines _____ and _____ [EAMCET 1994]

- (a) (0, 0) (b) (-2, -2)

(c) (-1, -1) (d) (-1, -2)
25. The area bounded by the angle bisectors of the lines _____ and the line _____, is _____

[IIT Screening 2004]

- (a) 2 (b) 3
- (c) 4 (d) 6

Equation of pair of straight lines

1	d	2	a	3	d	4	b	5	c
6	a	7	a	8	a	9	c	10	d
11	a	12	d	13	c	14	a	15	a
16	a	17	c	18	a	19	d	20	a
21	a	22	c	23	d	24	b	25	b
26	c	27	a	28	c	29	a	30	d
31	d	32	c	33	a	34	d	35	a
36	b	37	c	38	a	39	b	40	a
41	c	42	c	43	c	44	b	45	d
46	a	47	c	48	b	49	c	50	c
51	b	52	c	53	b	54	a	55	d
56	a	57	d	58	a	59	c	60	a
61	b	62	d	63	c	64	b	65	b
66	b	67	a	68	c	69	a	70	b
71	a	72	c	73	a				

Angle between the pair of straight lines, Condition for parallel and perpendicular lines

1	b	2	a	3	a	4	b	5	a
6	a	7	a	8	a	9	c	10	c
11	d	12	c	13	c	14	d	15	d
16	c	17	c	18	a	19	c	20	c
21	a	22	a	23	a	24	d	25	a
26	b	27	c	28	b	29	a	30	b
31	a	32	a	33	a	34	d	35	b
36	d	37	b	38	c	39	a	40	a
41	b	42	c	43	a	44	a		

Bisectors of the angle between the lines, Point of intersection of the lines

1	c	2	a	3	a	4	c	5	c
6	b	7	d	8	a	9	a	10	a
11	c	12	d	13	d	14	d	15	c
16	c								

Equation of lines joining the origin to the point of intersection of a curve and a line and Distance between the pair of lines

1	b	2	a	3	d	4	b	5	c
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6	a	7	d	8	c	9	b	10	a
11	b	12	b	13	c	14	c	15	b
16	c	17	c	18	d				

Critical Thinking Questions

1	a	2	a	3	d	4	c	5	a
6	d	7	a	8	b	9	a	10	d
11	a	12	d	13	a	14	c	15	c
16	b	17	c	18	b	19	b	20	b
21	a	22	a	23	c	24	c	25	a