

Topic: “Pair of Straight Lines”

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1. Find the acute angle between the lines represented by $x^2 - 2xy \operatorname{cosec} a + y^2 = 0$.
2. Find the separate equations of the lines represented by the equation $3x^2 - 10xy - 8y^2 = 0$.
3. If $2x + y = 0$ is one of the lines represented by $3x^2 + kxy + 2y^2 = 0$ then, the value of k is
(a) $\frac{1}{2}$ (b) $\frac{11}{2}$ (c) $\frac{5}{2}$ (d) $\frac{-11}{2}$

4. Find the values of p dan q, if the following equation represents a pair of perpendicular lines :

$$px^2 - 8xy + 3y^2 + 14x + 2y + q = 0.$$

5. Show that the equation $x^2 - 6xy + 5y^2 + 10x - 14y + 9 = 0$ represents a pair of lines .find the acute angle between them .Also find the point of intersection of the lines.

6. Prove that a homogeneous equation of degree two in x and y (i.e. $ax^2 + 2hxy + by^2 = 0$) represents a pair of lines through the origin if $h^2 - ab \geq 0$.

7. Find the joint equation of the pair of lines through the origin each of which is making an angle of 30° with the line $3x + 2y - 11 = 0$.

8. If the angle between the lines represented by $ax^2 + 2hxy + by^2 = 0$ is equal to the angle between the lines $2x^2 - 5xy + 3y^2 = 0$ then show that $100(h^2 - ab) = (a + b)^2$.

9. If an equation $hxy + gx + fy + c = 0$ represents a pair of lines ,them

(a) $fg = ch$ (b) $gh = cf$ (c) $fh = cg$ (d) $hf = -cg$

10. Find 'k', if the sum of slopes of lines represented by equation $x^2 + kxy - 3y^2 = 0$ is twice their product.

11. Find k if the slope of the lines given by $kx^2 + 4xy - y^2 = 0$ is 3 times the other .

12. If θ is the acute angle between the lines $3x^2 + 4xy + by^2 = 0$ and $\tan \theta = \frac{1}{2}$, find b.

13. Find the joint equation of pair lines passing through the origin and perpendicular to the lines represented by $2x^2 + 7xy + 3y^2 = 0$

14. Find k , if the equation $kxy + 10x + 6y + 4 = 0$ represents a pair of lines .

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15. Find the combined equation of a pair of lines passing through the origin and making an angle of 30° with the line $2x - y = 5$.

16. Find the values of K , if the lines represented by $K(x^2 + y^2) = 8xy$ are co-incident .

17. Find the values of p and q if the equation $12x^2 + 7xy - py^2 + 18x + 9y + 6 = 0$ represents a pair of perpendicular lines.

18. Show that every homogeneous equation of second degree in x and y represents a pair of straight lines passing through the origin

19. Find the combined equation of the pair of lines through the origin such that one of them is parallel to $3x - y = 7$ and other is perpendicular to $2x + y = 8$.

20. if the angle between the lines $ax^2 + 2hxy + by^2 = 0$ is equal to the angle between the lines $2x^2 - 5xy + 3y^2 = 0$, then prove that $100(h^2 - ab) = (a + b)^2$.

21. Find the acute angle between the lines given by $x^2 - 4xy + y^2 = 0$.

22. Find p and k if the following equation represents a pair of perpendicular lines
 $px^2 - 8xy + 3y^2 + 14x + 2y + k = 5$.

23. Find the condition that the lines given by $a^2x^2 + bcy^2 = a(b + c)xy$ may be parallel to each other.

24. Find the joint equation of the pair of lines through $(1,3)$ and parallel to the lines represented by the equation $3x^2 + 10xy + 8y^2 = 0$.

25. If the lines represented by $x^2 + kxy + 4y^2 = 0$ are coincident, then find the value of k .

26. If the slope of one of the lines given by $ax^2 + 2hxy + by^2 = 0$ is 3 times the other, prove that :
 $3h^2 = 4ab$.

27. Show that the equation $2x^2 - xy - 3y^2 - 6x + 19y - 20 = 0$ represents the pair of lines and find acute angle between them.

28. Prove that the acute angle θ between the pair of straight line $ax^2 + 2hxy + by^2 = 0$ is given by $\tan \theta = \left| \frac{2\sqrt{h^2 - ab}}{a+b} \right|$, where $a + b \neq 0$

29. Find K if one of the line given by $kx^2 + 10xy + 8y^2 = 0$ is perpendicular to $2x - y = 5$.

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30.(a) Find the value of k, if the following represent a pair of lines

$3x^2 + 10xy + 3y^2 + 16y + k = 0$. Further find whether these lines are parallel or intersecting.

(b) Find the joint equation of the pair of lines through the origin and perpendicular to the lines given by $5x^2 - 8xy + 13y^2 = 0$.

