**MATHEMATICS**

**PAGEMAKER10**

**pair of straight line**

Q1. If one of the lines of is a bisector of the angle between the lines then is

(a)

(b)

(c)

L1Difficulty1

Qtag Mathematics

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Q2. The equation of the bisectors of the angle between lines represented by equation is

(a)

(b)

(c)

(d)

L1Difficulty1

Qtag Mathematics

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Q3. If falls inside the angle made by the lines and then belongs to

(a)

(b)

(c)

(d)

L1Difficulty1

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Q4. The equation of the locus of foot of perpendicular drawn from the origin to the line passing through a fixed point is

(a)

(b)

(c)

(d) None of these

L1Difficulty1

Qtag Mathematics

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Q5. Let and be non-zero real numbers. The, the equation represents

(a) Four straight lines, when and are of the same sign

(b) Two straight lines and a circle, when and is of sign opposite to that of

(c) Two straight lines and a hyperbola, when and are of the same sign and is of sign opposite to that of

(d) A circle and an ellipse, when and are of the same sign and is of sign opposite to that of .

L1Difficulty1

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Q6. The product of perpendiculars drawn from the origin to the lines represented by the equation

will be

(a)

(b)

(c)

(d)

L1Difficulty1

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Q7. The equations to a pair of opposite sides of a parallelogram are and The equations to its diagonals are

(a) and

(b) and

(c) and

(d) and

L1Difficulty1

Qtag Mathematics

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Q8. Area of the triangle formed by the lines and is

(a)

(b)

(c)

(d) None of these

L1Difficulty1

Qtag Mathematics

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Q9. If the pair of straight lines given by forms an equilateral triangle with line then is

(a)

(b)

(c)

(d)

L1Difficulty1

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Q10. The area (in square units) of the quadrilateral formed by the two pairs of lines

and is

(a)

(b)

(c)

(d)

L1Difficulty1

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**Solutions**

S1. Ans. (c)

Sol.

Equation of bisectors of lines are put in we get

S2. Ans. (a)

Sol.

S3. Ans. (a)

Sol.

As lies in the angle made by the lines and

So, the slope of line joining to origin will lie between and

S4. Ans. (a)

Sol.

is the equation of line.

Coordinates of point =

**Aliter :** Check by options (a) it satisfy both origin and point So it is correct.

S5. Ans. (b)

Sol.

Clearly, and

which is homogeneous of degree 2, represents two straight lines passing through origin.

Now, if and sign of is opposite of then which represent a circle.

S6. Ans. (d)

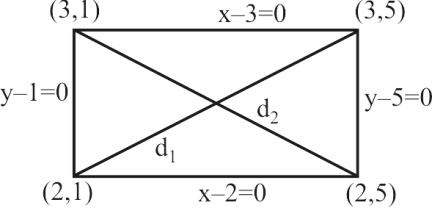
Sol.

The product of perpendiculars = .

S7. Ans. (c)

Sol.

Equation of diagonal is

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Equation of diagonal is

So equations are, and

S8. Ans. (a)

Sol.

The lines represented by and and and third line is

Therefore, coordinates of vertices of triangle are given by and .

Hence, area of

**Aliter :** Applying the formula given in the theory from the required area is

S9. Ans. (d)

Sol.

We know that the pair of lines

with the line form an equilateral triangle. Hence comparing with then

Now,

S10. Ans. (a)

Sol.

Given lines are (on factorising)

Area =

**LEVEL-II**

Q1. The locus of the point satisfying the relation is

(a) Straight line

(b) Pair of straight lines

(c) Circle

(d) Ellipse

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q2. 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

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q3. The equation of the pair of straight lines, each of which makes an angle with the line is

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q4. If the bisectors of the lines be then

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q5. The angle between the pair of straight lines is

(a)

(b)

(c)

(d) None of these

L3Difficulty3

Qtag Mathematics

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Q6. The pair of lines represented by

are perpendicular to each other for

(a) Two values of

(b)

(c) For one value of

(d) For no value of

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q7. The figure formed by the lines and is

(a) A right angled triangle

(b) An isosceles triangle

(c) An equilateral triangle

(d) None of these

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q8. The equation when is a real number, represents a pair of straight lines. If is the angle between the lines, then

(a) 3

(b) 9

(c) 10

(d) 100

L3Difficulty3

Qtag Mathematics

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Q9. If one of the lines of the pair bisects the angle between positive directions of the axes, then satisfy the relation

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

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Q10. The lines joining the origin to the points of intersection of the line and the circle will be mutually perpendicular, if

(a)

(b)

(c)

(d)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

**Solutions**

S1. Ans. (b)

Sol.

Squaring both sides, we get

Again, squaring we get the given equation is pair of straight lines.

S2. Ans. (a)

Sol.

Let the lines represented by given equation be

d and .

Then

Comparing the coefficients of and constant term, we get

and

Also, the point of intersection of and

is

Therefore, the square of distance of this point from

origin is

Now putting the value defined above, we get the required distance, .

S3. Ans. (d)

Sol.

Any line through the origin is If it makes an angle with the line then we should have

or

But hence on eliminating we get the required equation

S4. Ans. (a)

Sol.

Bisector of the angle between the lines is

But it is represented by

Therefore

S5. Ans. (d)

Sol.

S6. Ans. (a)

Sol.

The lines are perpendicular, if coefficient of coeffieicnt of

The equation is a quadratic equation in and

The roots of are real and distinct. Therefore, the lines are perpendicular to each other for two values of .

S7. Ans. (c)

Sol.

and

S8. Ans. (c)

Sol.

The equation represents a pair of straight lines.

=0

If is the angle between the lines, then

S9. Ans. (b)

Sol.

Bisector of the angle between positive directions of the axes is Since it is one of the lines of the given pair we have

or

S10. Ans. (c)

Sol.

Making the equation of circle homogeneous with the help of line we get

….(i)

Hence lines represented by (i) are perpendicular, if

**LEVEL-III**

Q1. The angle between the lines joining the points of intersection of line and the curve to the origin, is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q2. 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

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q3. 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

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q4. The equation of the pair of straight lines parallel to -axis and touching the circle

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q5. Two of the lines represented by the equation will be perpendicular, then

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q6. The lines represented by the equation will be equidistant from the origin, if

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q7. The circumcentre of the triangle formed by the lines and

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q8. The area bounded by the angle bisectors of the lines and the line is

(a) 2

(b) 3

(c) 4

(d) 6

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q9. The area enclosed by the pair of lines the line and is

(a) 20 sq. units

(b) 10 sq. units

(c) 5/4 sq. units

(d) 0 sq. units

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q10. The graph of consists of a pair of straight lines lying

(a) To the left of

(b) Above

(c) Below

(d) To the right of

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

**Solutions**

S1. Ans. (b)

Sol.

Find the equation of lines represented by the points of intersection of curve and line with origin, we get

Proceed and find the angle between the lines represented by it using .

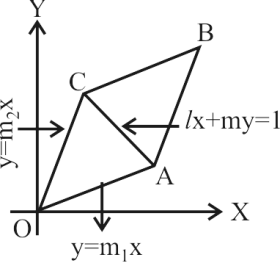
S2. Ans. (b)

Sol.

Let the equation of lines represented by

be and

and one diagonal be

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Therefore and

Now on solving the equation of and with the line we get the coordinates of

and

Now find the coordinates of mid-point of and the equation of diagonal through this mid-point and origin. The required equation is

S3. Ans. (b)

Sol.

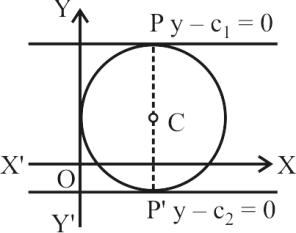
Angle between the given lines is

S4. Ans. (a)

Sol.

Let the lines are and since pair of straight lines parallel to -axis, and the lines will be and

Given circle is centre (3, 2) and radius = 5.

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Here, the perpendicular drawn from centre to the lines are and

and

Hence the lines are

Pair of straight lines is

S5. Ans. (a)

Sol.

Let

Comparing the coefficient of similar terms.

We get,

S6. Ans. (c)

Sol.

Let the equations represented by

be

and .

Then the combined equation represented by these lines is given by

So, it must be similar with the given equation.

On comparing, we get

According to the condition, the length of perpendicular drawn from origin to the lines are same.

So,

Now on eliminating and we get the required condition

S7. Ans. (c)

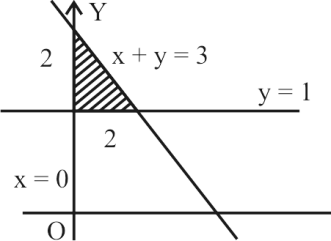
Sol.

The separate equations of the lines given the are and Solving the equations of the vertex of the triangle, we obtain the coordinates of the vertex as and . Clearly, is in right angled triangle with right angle at . Therefore, the centre of the circum-centre is the midpoint of with coordinates are

S8. Ans. (a)

Sol.

The angle bisectors of the lines given by are

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Therefore, required area

S9. Ans. (a)

Sol.

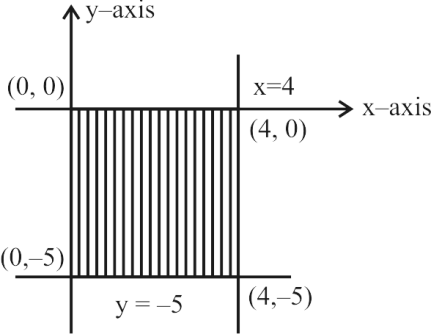
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Figure formed is a rectangle of length 5 units, break = 4 units.

Area = sq. units.

S10. Ans. (b)

Sol.

is for all

above -axis.