THE PAIR OF STRAIGHT LINES-III

Class: IX, Work Sheet NO: 20.

SOLUTIONS

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LECTURE TASK

01. $x^2 + xy - 2y^2 - 5x + 2y - 4 = 0$

$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$

$a = 1,\ h = \frac{1}{2},\ b = -2,\ g = -\frac{5}{2},\ f = 1$

$c = -4$

point of Intersection

$$= \left(\frac{hf - bg}{ab - h^2}, \frac{gh - af}{ab - h^2}\right)$$

$$= \left(\frac{\frac{1}{2}\cdot 1 + 2\cdot\left(-\frac{5}{2}\right)}{1\cdot(-2) - \left(\frac{1}{2}\right)^2}, \frac{\left(-\frac{5}{2}\right)\cdot\frac{1}{2} - 1\cdot 1}{1(-2) - \left(\frac{1}{2}\right)^2}\right)$$

$$= (2, 1)$$

Ans: opt: D

02. $\lambda x^2 - 5xy + 6y^2 + x - 3y = 0$

$a = \lambda,\ h = -\frac{5}{2},\ b = 6,\ g = \frac{1}{2},\ f = -\frac{3}{2}$

$c = 0$.

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$\Delta = abc + 2fgh - af^2 - bg^2 - ch^2 = 0$ ②

$\lambda \cdot 6 \cdot 0 + 2 \cdot \left(-\frac{3}{2}\right)\left(\frac{1}{2}\right)\left(-\frac{5}{2}\right) - \lambda \cdot \left(-\frac{3}{2}\right)^2$

$- 6 \cdot \left(\frac{1}{2}\right)^2 - 0 \cdot \left(-\frac{5}{2}\right)^2 = 0$

$\Rightarrow \frac{15}{4} - \frac{9\lambda}{4} - \frac{6}{4} = 0$

$\Rightarrow \lambda = 1$ i.e. $a = 1$

point of intersection $= \left(\frac{hf - bg}{ab - h^2}, \frac{gh - af}{ab - h^2}\right)$

$= (-3, -1)$.

Ans: opt. A

03. $ax^2 + 3xy - 2y^2 - 5x + 5y + c = 0$

Since the lines are perpendicular

we have $a + b = 0$

$\Rightarrow a - 2 = 0$

$\Rightarrow a = 2$.

$\Delta = abc + 2fgh - af^2 - bg^2 - ch^2 = 0$

$\Rightarrow 2 \cdot (-2) \cdot c + 2 \cdot \left(\frac{5}{2}\right) \cdot \left(-\frac{5}{2}\right)\left(\frac{3}{2}\right) - 2\left(\frac{5}{2}\right)^2$

$- (-2) \cdot \left(-\frac{5}{2}\right)^2 - c \cdot \left(\frac{3}{2}\right)^2 = 0$

$\Rightarrow c = -3$

Point of intersection $= \left(\frac{-1}{5}, \frac{-7}{5}\right)$ ③

Ans: opt: C

04. Given $11x^2+16xy-y^2=0$ and

$x-2y+13=0$.

$\therefore 11x^2+16xy-y^2 = (x-2y)^2 - 3(2x+y)^2$

$ax^2+2hxy+by^2 = (lx+my)^2 - 3(mx-ny)^2$

hence the given lines form an equilateral triangle.

Ans. opt: A

05 ~~Given~~ $\cancel{2x^2+3xy-2y^2=0}$ ~~and~~

$2h=-12$
$h=-6$

$2h=2$
$h=1$ $\cancel{3x+y+1=0}$

$\therefore \cancel{2x^2+3xy-2y^2 = (3x+y)^2 - 3(x-3y)^2}$

05 Given $2x^2+3xy-2y^2=0$ and

$3x+y+1=0$.

Now
$2x^2+3xy-2y^2 = (3x+y)^2 - 1\cdot(x-3y)^2 = 0$

$ax^2+2hxy+by^2 = (lx+my)^2 - k(mx-ny)^2$

if $k=1$, then the triangle is a right angled isosceles triangle.

Ans: opt: C

06 Given $9x^2 - 12xy + Ky^2 = 0$ and

$x + 3y - 1 = 0$.

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Since the triangle is right angled we have ~~to show that~~ one of the pair of lines is perpendicular to $x+3y-1=0$.

Now, Eqn of one of the line is of given pair of lines is

$$ax + (h + \sqrt{h^2 - ab})y = 0.$$

i.e. $9x + (-6 + \sqrt{36 - 9K})y = 0.$

Given line $x + 3y - 1 = 0$

Let Both the lines are perpendicular

We have $a_1 a_2 + b_1 b_2 = 0$

$$9 \cdot 1 + (-6 + \sqrt{36 - 9K}) \cdot 3 = 0.$$

Clearly $K = 3$.

Ans: opt: A

07 Given $(\alpha, \beta) = (-2, 3)$

$$x^2 - y^2 + 2x + 1 = 0$$

$$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$$

product of the perpendiculars (5)

$$= \frac{|a\alpha^2 + 2h\alpha\beta + b\beta^2 + 2g\alpha + 2f\beta + c|}{\sqrt{(a-b)^2 + 4h^2}}$$

$$= \frac{|(-2)^2 - 3^2 + 2(-2) + 1|}{\sqrt{(1+1)^2 + 4(0)^2}}$$

$$= 4$$

08. $6x^2 - 5xy + 6y^2 + 14x + 16y + 14 = 0$

product of the perpendicular distances from the origin is

$$d_1 d_2 = \frac{|c|}{\sqrt{(a-b)^2 + 4h^2}}$$

$$= \frac{|14|}{\sqrt{(6-6)^2 + 4\left(\frac{-5}{2}\right)^2}} = \frac{14}{5}$$

Ans: opt B

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09. Given $hxy + gx + fy + c = 0$.

Also point $(f, -g)$.

The product of the perpendicular distances

$$= \frac{|h.f.(-g) + g(f) + f(-g) + c|}{\sqrt{(0-0)^2 + 4\left(\frac{h}{2}\right)^2}}$$

$$= \cancel{|-hf}$$

$$= \frac{|-fgh + c|}{\sqrt{h^2}} = \left|\frac{fgh - c}{h}\right|$$

Ans: opt D.

10. $12x^2 + 25xy + 12y^2 + 10x + 11y + 2 = 0$

$$d_1 d_2 = \frac{|2|}{\sqrt{(12-12)^2 + 4\left(\frac{25}{2}\right)^2}} = \frac{2}{25}$$

Ans: opt: B.

JEE ADVANCED LEVEL

11. Given $x^2 - y^2 = 0$, $Kx + 2y - 1 = 0$

$a = 1, h = 0, b = -1,$ $l = K, m = 2, n = -1$

Isosceles triangle condition

$h(l^2 - m^2) = (a-b)lm$

$0(k^2 - 4) = (1+1) \cdot k \cdot 2$

$\Rightarrow k = 0$

Ans: opt: D

12. $ax^2 + 2hxy + by^2 = 0$, $(1,1)$

$$\frac{|a \cdot 1^2 + 2h \cdot 1 \cdot 1 + b \cdot 1^2|}{\sqrt{(a-b)^2 + 4h^2}} = 1$$

$\Rightarrow |a + 2h + b| = \sqrt{(a-b)^2 + 4h^2}$

$\Rightarrow a^2 + 4h^2 + b^2 + 4ah + 4hb + 4ab = a^2 - 2ab + b^2 + 4h^2$

$\Rightarrow h(a+b) + ab = 0$

Ans. opt: C

13. Statement I:

Clearly the point of intersection of the lines $x^2 - y^2 - 2x + 2y = 0$

is (0,0).

Now, $2x^2 - 5xy + 2y^2 + x + y - 1 = 0$

$a = 2$, $h = -\frac{5}{2}$, $b = 2$, $g = \frac{1}{2}$, $f = \frac{1}{2}$, $c = -1$

point of intersection of the lines

$$= \left(\frac{hf - bg}{ab - h^2}, \frac{gh - af}{ab - h^2}\right)$$

$$= \left(\frac{-\frac{5}{2}\cdot\frac{1}{2} - 2\cdot\frac{1}{2}}{2.2 - \left(-\frac{5}{2}\right)^2}, \frac{\frac{1}{2}\cdot\left(-\frac{5}{2}\right) - 2\cdot\frac{1}{2}}{2\cdot 2 - \left(-\frac{5}{2}\right)^2}\right)$$

$= (1,1)$

The distance between (0,0) and (1,1) is $\sqrt{2}$.

hence, statement I is FALSE.

statement II: clearly statement II is TRE.

Ans: ~~D~~ opt: D

14 ~~$2x^2 + 4x$~~

14. Statement I:

$2x^2 + 4xy - 6y^2 + 3x + y + 1 = 0$.

$$d = \frac{|c|}{\sqrt{(a-b)^2 + 4h^2}}$$

$$d = \frac{|11|}{\sqrt{(2+6)^2 + 4\cdot(2)^2}} = \frac{1}{\sqrt{80}}$$

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hence, statement I is TRUE.

Statement II: clearly the statement II is TRUE.

Also, statement II is the correct explanation of statement I.

Ans: opt: A.

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17 $5x^2 + 2xy + 2y^2 - 2x - 2y + 1 = 0$

$a = 5,\ h = 1,\ b = 2,\ g = -1,\ f = -1,\ c = 1$

$$d = \frac{c(a+b) - f^2 - g^2}{ab - h^2}$$

$$= \frac{1(5+2) - 1 - 1}{5\cdot 2 - 1} = \frac{5}{9}$$

Ans: C

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18 $3x^2 + 2xy + y^2 - 4x - 4y + 5 = 0$

$a = 3,\ h = 1,\ b = 1,\ g = -2,\ f = -2,\ c = 5$

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$$d = \frac{c(a+b) - f^2 - g^2}{ab - h^2}$$

10

$= 6$

Ans: A

19 $2x^2 - 5xy + 2y^2 = 0$; $(\alpha, \beta) = (-1, 2)$

$a = 2$, $h = -\frac{5}{2}$, $b = 2$.

$$d = \frac{|a\alpha^2 + 2h\alpha\beta + b\beta^2|}{\sqrt{(a-b)^2 + 4h^2}} = 4$$

Ans: A

20 $x^2 - xy + 2y^2 = 0$; $(\alpha, \beta) = (1, 1)$

$a = 2$, $h = -\frac{1}{2}$, $d = 2$

Apply the formula, We get $d = \sqrt{2}$

Ans: B

21 $12x^2 + 25xy + 12y^2 + 11y + 2 = 0$

$a = 12$, $h = \frac{25}{2}$, $b = 12$, $c = 2$

$$d = \frac{|c|}{\sqrt{(a-b)^2 + 4h^2}} = K$$

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$$\Rightarrow \frac{2}{\sqrt{(12-12)^2+4\left(\frac{25}{2}\right)^2}} = k$$

$$\Rightarrow \frac{2}{25} = k$$

$$\Rightarrow 25k - 2 = 0.$$

Ans: 0

22 Given $(x+2a)^2 - 3y^2 = 0$

$$\Rightarrow (x+2a)^2 - (\sqrt{3}y)^2 = 0$$

$$\Rightarrow (x+2a+\sqrt{3}y)(x+2a-\sqrt{3}y) = 0$$

$$\Rightarrow x+\sqrt{3}y+2a = 0 \longrightarrow (1)$$

$$x-\sqrt{3}y+2a = 0 \rightarrow (2)$$

$$x-a = 0 \rightarrow (3).$$

Finding the angles between the lines, we get smallest angle is 60°.

23

Using the given formula we can get the point of intersection of a,b,c,d as (0,0),(1,1),(0,1),(1,0) respectively

$$(x,y) = \left(\frac{hf-bg}{ab-h^2}, \frac{gh-af}{ab-h^2}\right)$$

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13

a) $x^2 - y^2 + 2y - 1 = 0$

$a = 1,\ b = -1,\ h = 0,\ g = 0,\ f = 1,\ c = -1$

$$d = \frac{c(a+b) - f^2 - g^2}{ab - h^2}$$

$= 1$

b) $3x^2 - 11xy + 10y^2 - 7x + 13y + K = 0$

$a = 3,\ h = \frac{-11}{2},\ b = 10,\ g = \frac{-7}{2}$

$f = \frac{13}{2},\ c = K$

$\Delta = abc + 2fgh - af^2 - bg^2 - ch^2 = 0$

find the value of K.

point of intersection is

$$= \left(\frac{hf - bg}{ab - h^2}, \frac{gh - af}{ab - h^2}\right)$$

$= (3, 1)$

c) $x^2 - 2xy + 3y^2 = 0$

clearly point of intersection is $(0, 0)$.

d) $K = 3$, Conceptual.

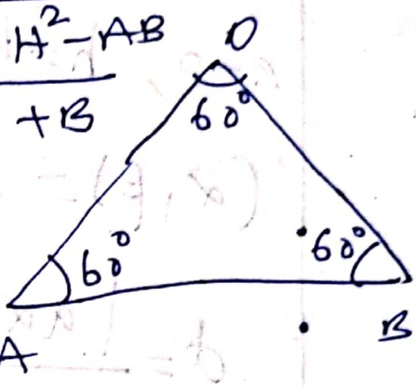
Ans: ~~a → t, b → p, c →~~

$a \to r,\ b \to p,\ c \to s,\ d \to q$

LEARNER'S TASK

C.U.Q's

01. $\tan\theta = \dfrac{2\sqrt{h^2 - ab}}{a+b} = \dfrac{2\sqrt{H^2 - AB}}{A+B}$



$\tan 60° = \dfrac{2\sqrt{H^2 - AB}}{A+B}$

$\Rightarrow \cancel{\sqrt{3} = 2}$

$\Rightarrow \sqrt{3}(A+B) = 2\sqrt{H^2 - AB}$

$\Rightarrow 3(A+B)^2 = 4(H^2 - AB)$

$\Rightarrow 4h^2 = 4AB + 3A^2 + 3B^2 + 6AB$

$= (A+3B)(3A+B)$.

Ans: opt D

02. The point of intersection of the pair of lines $ax^2 + 2hxy + by^2 = 0$ is $(0,0)$.

when the origin is shifted to (α, β), the new equation of pair of lines is

$a(x-\alpha)^2 + 2h(x-\alpha)(y-\beta) + b(y-\beta)^2 = 0$

hence point of intersection is (α, β)

Ans. opt B

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03. $hxy + gx + fy + c = 0$ (15)

$a=0,\ h=h,\ b=0,\ g=\frac{g}{2},\ f=\frac{f}{2},\ c=c$

$(\alpha,\beta) = (f,-g)$

$$d = \frac{|a\alpha^2+2h\alpha\beta+b\beta^2+2g\alpha+2f\beta+c|}{\sqrt{(a-b)^2+4h^2}}$$

$= |fg|$

Ans.. Opt A

04. $ax^2+2hxy+by^2=0$.

point of intersection $= (0,0)$.

Ans: opt: D

05 The value of $k=3$,

Since $ax+by+c=0$ and

$(ax+by)^2 - 3(bx-ay)^2 = 0$ always

forms an equilateral triangle

Ans: opt: 3

06. $S = ax^2+2hxy+by^2=0$

If $a+b=0$, then the pair of

16

Lines are perpendicular.

Also, when $al^2 + 2hlm + bm^2 = 0$

i.e. $S(l, m) = 0$

Also, the pair of lines are perpendicular.

Ans. opts: D.

07. All the options satisfies.
(Conceptual)

Ans. opt D.

08. All the options satisfied.
(Conceptual)

Ans. opt: D.

09. $d = \frac{|c|}{\sqrt{(a-b)^2 + 4h^2}}$

Ans. opt: A

10. $d = \frac{|a\alpha^2 + 2h\alpha\beta + b\beta^2 + 2g\alpha + 2f\beta + c|}{\sqrt{(a-b)^2 + 4h^2}}$

$$d = \frac{|S_{11}|}{\sqrt{(a-b)^2+4h^2}}$$

$\therefore$ Ans: opt: B.

JEE MAINS LEVEL QUESTIONS

01. $x^2-y^2=0$, $lx+2y-1=0$

Isosceles triangle condition is

$h^2(l^2-m^2)=(a-b)lm$

$0(l^2-m^2)=(1+1).l.2$

$\Rightarrow l=0$.

~~opt~~ Ans: opt: D

02. $12x^2+25xy+12y^2+10x+11y+2=0$

$a=12,\ h=\frac{25}{2},\ b=12,\ g=5,\ f=\frac{11}{2},\ c=2$

$$d = \frac{|c|}{\sqrt{(a-b)^2+4h^2}} = \frac{2}{\cancel{\ }}\ \frac{2}{25}$$

Ans: opt: B

03. $6x^2-5xy-6y^2+x+5y-1=0$

$a=6,\ h=-\frac{5}{2},\ b=-6,\ g=\frac{1}{2},\ f=\frac{5}{2}$

$c=-1$.

$$d = \boxed{\frac{f^2+g^2}{h^2-ab}} = \frac{2}{13}$$

$$\frac{c(a+b)-f^2-g^2}{ab-h^2} = \frac{2}{13}$$

Ans: opt: D

04. $xy - x - y + 1 = 0$

$x(y-1) - (y-1) = 0$

$(x-1)(y-1) = 0$ $\therefore (x, y) = (1, 1)$.

$\Rightarrow x = 1,\ y = 1$

Now, $ax + 2y - 3 = 0$

$\Rightarrow a \cdot 1 + 2 \cdot 1 - 3 = 0$

$\Rightarrow a = 1$

Ans: opt: C

05. $x^2 + py^2 + y - q^2 = 0$.

pair of perpendicular lines $a+b=0$

$\Rightarrow 1 + p = 0 \Rightarrow p = -1$.

$\therefore a = 1,\ b = -1,\ h = 0,\ g = 0,\ f = \frac{1}{2},\ c = -q^2$

$$P \cdot I = \left(\frac{hf-bg}{ab-h^2}, \frac{gh-af}{ab-h^2}\right)$$

$$= (0, q)$$

Ans: opt: C

06. $(y^2 - 4xy - x^2)(x + y + 1) = 0$

$\Rightarrow y^2 - 4xy - x^2 = 0$ or $x + y + 1 = 0$

~~a=1, 2b~~

here $a = -1$, $b = 1$

also $a + b = 0$

hence the given pair of lines are perpendicular.

Ans: opt: B

07. $x^2 - 3y^2 = 0$, $x - 4 = 0$

$(ax+by)^2 - 3(bx-ay)^2 = 0$

hence the triangle is equilateral.

Ans: opt: D

08. $2x^2 - 5xy + y^2 = 0$ $(\alpha, \beta) = (0, 1)$

$a = 2$, $h = -\frac{5}{2}$, $b = 1$

$$d = \frac{|a\alpha^2 + 2h\alpha\beta + b\beta^2|}{\sqrt{(a-b)^2 + 4h^2}} = \frac{1}{\sqrt{26}}$$

Ans: opt: B

09

$$\frac{3}{2} = \frac{|1^2 - 4.1.K + K^2|}{\sqrt{(1-1)^2 + 4(-2)^2}}$$

$\Rightarrow K = 5$

Ans. opt B

10. $3x^2 - 11xy + 10y^2 - 7x + 13y + k = 0$

$a = 3,\ h = \frac{-11}{2},\ b = 10,\ g = \frac{-7}{2},\ f = \frac{13}{2}$

$c = k.$

$\Delta = abc + 2fgh - af^2 - bg^2 - ch^2 = 0$

$P.I = \left(\frac{hf - bg}{ab - h^2}, \frac{gh - af}{ab - h^2}\right)$

$= (3, 1)$

Ans: opt : B

JEE ADVANCED LEVEL QUESTIONS

11. Clearly $x^2 - y^2 - 2x + 2y = 0$

passes through $(0,0)$.

Also $2x^2 - 5xy + 2y^2 + x + y = 0$

also passes through $(0,0)$.

hence distance between the points

is $(0,0)$

Ans: opt: B

12. $x^2 - 5xy + 4y^2 + x + 2y - 2 = 0$

$P.I = \left(\frac{hf - bg}{ab - h^2}, \frac{gh - af}{ab - h^2}\right)$

$= (2, 1)$

Ans, opt: B

13. Statement I:

$$x^2 - 5xy + 4y^2 + 8x - 11y + 7 = 0$$

clearly (1, 2) satisfies the above equation.
hence statement I is TRUE.

Statement II:

Clearly statement II is TRUE.
Also statement II is the correct explanation of statement I.

Ans: opt: A

14. Statement I:

$$\frac{k^2 + 4.k.k + 3.k^2}{\sqrt{(1-3)^2 + 4(2)^2}} = \frac{4}{\sqrt{5}}$$

$\Rightarrow \quad k = \pm 1$

hence statement I is TRUE.

Statement II:

clearly statement II is TRUE
Also, statement II is the correct

explanation of statement I.

(22)

Ans: opt: A

17 $3x^2 + 7xy + 2y^2 + 5x - 5y + 2 = 0$

$$P.I = \left(\frac{hf - bg}{ab - h^2}, \frac{gh - af}{ab - h^2}\right)$$

$$= \left(-\frac{3}{5}, -\frac{1}{5}\right)$$

Ans: opt B.

18 $2x^2 + 3xy - 2y^2 + 3x - 9y - 9 = 0$

$$P.I = \left(\frac{3}{5}, -\frac{9}{5}\right)$$

Ans: opt: A

19 $x^2 - 4xy + y^2 - 2x - 4y + 1 = 0$

$$d = \frac{|1|}{\sqrt{(1-1)^2 + 4(-2)^2}} = \frac{1}{4}$$

Ans: opt: D

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$$\frac{|K|}{\sqrt{(1+3)^2 + 4(3)^2}} = \frac{1}{\sqrt{52}}$$

$\therefore K = \pm 1$

Ans: opt: D

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23

21

$$x^2+3xy+2y^2-3x-4y+2=0$$

$a=1,\ h=\frac{3}{2},\ b=2,\ g=-\frac{3}{2},\ f=-2,\ c=2$

$$P.I=\left(\frac{hf-bg}{ab-h^2},\ \frac{gh-af}{ab-h^2}\right)$$

$$=(1,-1)$$

$$=(0,1)=(\alpha,\beta)$$

$\therefore\ 2\alpha+\beta=1$

Ans: 1

22

$$x^2-6xy-y^2-3x+4y+3=0$$

$a=1,\ h=-3,\ b=-1,\ g=-\frac{3}{2},\ f=2,\ c=3$

$$\frac{c(a+b)-f^2-g^2}{ab-h^2}=\frac{3}{2\sqrt{K}}$$

$$\Rightarrow \frac{3(1+1)-2^2-\left(-\frac{3}{2}\right)^2}{1(-1)-(-3)^2}=\frac{3}{2\sqrt{K}}$$

$\Rightarrow\ K=10$

Ans: 10

23 Using the necessary formulae we get the answers for a,b,c,d as t,p,q,r respectively.

24 a) $x^2 - 2xy + 3y^2 - 2x + y + 1 = 0$

$a = 1,\ h = -1,\ b = 3,\ g = -1,\ f = \frac{1}{2},\ c = 1$

$(\alpha, \beta) = (0, 0)$

$$d = \frac{|c|}{\sqrt{(a-b)^2 + 4h^2}} = \frac{1}{2\sqrt{2}}$$

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b) $x^2 - 4xy + y^2 - 3x + y + 1 = 0$ (25)

$(\alpha, \beta) = (1, 1)$

$$d = \frac{|a\alpha^2 + 2h\alpha\beta + b\beta^2 + 2g\alpha + 2f\beta + c|}{\sqrt{(a-b)^2 + 4h^2}}$$

$$= \frac{3}{2\sqrt{2}}$$

c) $x^2 + 2xy + y^2 + 3 = 0$; $(1, 1)$

$d = 3$

d) $x^2 + y^2 - 2x + 3y - 1 = 0$; $(1, 2)$

$a = 1$, $b = 1$, $h = 0$, $g = -1$, $f = \frac{3}{2}$

$c = -1$

$(a-b)^2 + 4h^2 = (1-1)^2 + 4 \cdot 0^2$

$= 0$.

hence, distance not defined.

Ans: $a \to s$, $b \to p$, $c \to q$, $d \to r$

Teaching Task (Jee mains)

15 **Assertion:** Given $2x^2 - 3xy + y^2 = 0$

Since these lines passes through the origin, the product of the perpendicular distances $= 0$ (True)

Reason: Conceptual (True)

Ans.: A

16 **Assertion:** Given

$$2x^2 + 5xy - 3y^2 + 4x - 6y - 8 = 0$$

here $a = 2$, $h = \frac{5}{2}$, $b = -3$

We have, $d = \frac{|c|}{\sqrt{(a-b)^2 + 4h^2}} = \frac{|-8|}{\sqrt{(2+3)^2 + 4\left(\frac{5}{2}\right)^2}}$

$$= \frac{8}{\sqrt{25 + 25}}$$

$$= \frac{8}{\sqrt{50}} = \frac{8}{5\sqrt{2}}$$

(False)

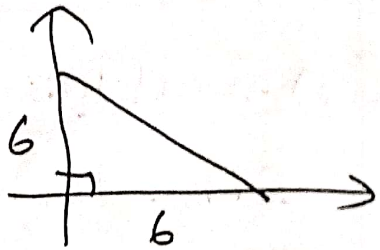
Reason: Conceptual (true)

Ans.: D

(Jee mains)

Learner's Table

15 **Assertion:** $x+y=6$



$$\Rightarrow \frac{x}{6}+\frac{y}{6}=1$$

$$\text{Area} = \frac{1}{2}\times 6\times 6 = 18 \quad (\text{True})$$

Reason: Conceptual (True)

Ans. A

16 **Assertion:** $3x^2+4xy+y^2+2x+3y-5=0$

$a=3,\ h=2,\ b=1$

$$\therefore\ d = \frac{|c|}{\sqrt{(a-b)^2+4h^2}} = \frac{|-5|}{\sqrt{(3-1)^2+4(2)^2}}$$

$$= \frac{5}{\sqrt{20}} \quad (\text{False})$$

Reason: Conceptual (~~False~~ True)

Ans. D

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