Q.1 The incentre of the triangle formed by the axes and the line $\frac{x}{a}+\frac{y}{b}=1$ is -

(A) $\left(\frac{a}{2},\frac{b}{2}\right)$

(B) $\left(\frac{ab}{a+b+\sqrt{ab}},\frac{ab}{a+b+\sqrt{ab}}\right)$

(C) $\left(\frac{a}{3},\frac{b}{3}\right)$

(D) $\left(\frac{ab}{a+b+\sqrt{a^2+b^2}},\frac{ab}{a+b+\sqrt{a^2+b^2}}\right)$

Q.2 A straight line through the point (2, 2) intersects the lines $\sqrt{3}x+y=0$ and $\sqrt{3}x-y=0$ at the point A & B. The equation to the line AB so that triangle OAB is equilateral -

(A) $x-2=0$ (B) $x+y-4=0$

(C) $y-2=0$ (D) None of these

Q.3 $\frac{x}{a}+\frac{y}{b}=1$ is a variable line such that $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{k^2}$. The locus of the foot of perpendicular from origin to the line is-

(A) $x^2+y^2-ax-by=0$

(B) $x^2+y^2+ax+by=a^2+b^2$

(C) $x^2+y^2=k^2$

(D) $x^2-y^2=2k^2$

Q.4 If a ray traveling along the line x = 1 gets reflected from the line x + y = 1 then the equation of the line along which the reflected ray travels is -

(A) $y=0$ (B) $x-y=1$ (C) $x=0$ (D) none of these

Q.5 The sides of a triangle are x = 2, y + 1 = 0 and x + 2y = 4. Its circumcentre is-

(A) (4, 0) (B) (2, – 1)

(C) (0, 4) (D) (2, 3)

Q.6 If r is the geometric mean of p and q, then the line px + qy + r = 0 -

(A) has a fixed direction

(B) passes through a fixed point

(C) forms with the axes a triangle of constant area

(D) sum of its intercepts on the axes is constant

Q.7 If $16a^2 – 40\ ab + 25\ b^2 – c^2 = 0$, then the line ax + by + c = 0 passes through the points -

(A) (4, – 5) and (– 4, 5)
(B) (5, – 4) and (– 5, 4)
(C) (1, – 1) and (– 1, 1)
(D) None of these

Q.8 The equations of two sides of a square whose area is 25 square units are 3x – 4y = 0 and

4x + 3y = 0. The equations of the other two sides of the square are-

(A) 3x – 4y ± 25 = 0, 4x + 3y ± 25 = 0

(B) 3x – 4y ± 5 = 0 , 4x + 3y ± 5 = 0

(C) 3x – 4y ± 5 = 0 , 4x + 3y ± 25 = 0

(D) none of these

Q.9 The equation of base of an equilateral triangle is x + y = 2. The vertex is (2, –1) then area of triangle is-

(A) $2\sqrt{3}$ (B) $\frac{\sqrt{3}}{6}$ (C) $\frac{1}{\sqrt{3}}$ (D) $\frac{2}{\sqrt{3}}$

Q. 10 ABCD is a rectangle A ≡ (1, 2), B ≡ (3, –4). If line CD passes through (3, 8), then mid-point of CD is

(A) (2, 6) (B) (6, 2)

(C) (2, 5) (D) $\left(\frac{28}{5}, \frac{1}{5}\right)$

Q. 11 The line L has intercepts a and b on the coordinate axes. When keeping the origin fixed, the coordinate axes are rotated through a fixed angle, then the same line has intercepts p and q on the rotated axes. Then

(A) $a^2 + b^2 = p^2 + q^2$ (B) $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{p^2} + \frac{1}{q^2}$

(C) $a^2 + p^2 = b^2 + q^2$ (D) $\frac{1}{a^2} + \frac{1}{p^2} = \frac{1}{b^2} + \frac{1}{q^2}$

Q. 12 A variable line drawn through the point (1, 3) meets the x- axis at A and y- axis at B. It the rectangle OAPB is completed, where 'O' is the origin, then locus of 'P' is-

(A) $\frac{1}{y} + \frac{3}{x} = 1$ (B) $x + 3y = 1$

(C) $\frac{1}{x} + \frac{3}{y} = 1$ (D) $3x + y = 1$

Q. 13 If we reduce $3x + 3y + 7 = 0$ to the form

$x \cos\alpha + y \sin\alpha = p$, then the value of p is

(A) $\frac{7}{2\sqrt{3}}$ (B) $\frac{7}{3}$

(C) $\frac{3\sqrt{7}}{2}$ (D) $\frac{7}{3\sqrt{2}}$

Q. 14 $ax - by - a^2 = 0$, where a, b are non-zero, is the equation to the straight line perpendicular to a line ℓ and passing through the point where ℓ crosses the x- axis. Then equation to the line ℓ is

(A) $\frac{x}{b} - \frac{y}{a} = 1$ (B) $\frac{x}{a} + \frac{y}{b} = 1$

(C) $\frac{x}{b} + \frac{y}{a} = ab$ (D) $\frac{x}{a} - \frac{y}{b} = ab$

Direction: **Assertion/Reason type Question.**

The following questions (Q. 15 to 24) given below consist of an "Assertion" (1) and "Reason "(2) Type questions. Use the following key to choose the appropriate answer.

(A) Both (1) and (2) are true and (2) is the correct explanation of (1)

(B) Both (1) and (2) are true but (2) is not the correct explanation of (1)

(C) (1) is true but (2) is false

(D) (1) is false but (2) is true

Q.15 **Statement (1) :** The st. lines $3x + 4y = 9$ and $6x + 8y + 15 = 0$ are parallel.

Statement (2) : They are on the opposite side of the origin.

Q.16 **Statement (1) :** Equation of the bisector of acute angle between the lines $4x – 3y + 7 = 0$ and $3x – 4y + 3 = 0$ is $x – y + 2 = 0$.

Statement (2): Any point on the bisector of the two lines always equidistant from the given lines.

Q.17 Three (or more) lines are said to be concurrent lines if all the lines pass through the same point.

Statement (1): If $3a –2 b + 5c = 0$ then the family of lines $ax + by + c = 0$ are concurrent.

Statement (2): If $L_1 = 0$ and $L_2 = 0$ are any two non-parallel lines then $L_1 + \lambda L_2 = 0$ represents a set of lines through the intersection of $L_1 = 0$ and $L_2 = 0$, where λ is a non-zero real number.

Q.18 The line joining two points A(–3, 2) and B(1, –2) make angle α with positive direction of x- axis. Then

Statement (1): $\sin 2\alpha \neq \cos 2\alpha = 1$

Statement (2): If a line makes angle θ with positive direction of x- axis then slope of line $= \tan\theta$

Q.19 **Statement (1)**: Area of triangle formed by line $3x + 4y + 12 = 0$ and coordinate axis is 6.

Statement (2): Area of triangle formed by line $Ax + By + C = 0$ and coordinate axis is $\frac{2C^2}{|AB|}$

Q.20 Sides of a triangle are $2x – 3y – 1 = 0$,

$3x + 2y – 5 = 0$ and $x + y – 1 = 0$ then

Statement (1): Orthocentre of the triangle is (1, 1)

Statement (2) : Orthocentre of a right angled triangle is the vertex at which angle is right angle.

Q.21 **Statement (1)** : If p is length of perpendicular from origin to the line $\frac{x}{a} + \frac{y}{b} = 1$ then a^2, $2p^2$ and b^2 are in H.P.

Statement (2) : If p is the perpendicular distance of line $\frac{x}{a} + \frac{y}{b} = 1$ from (0, 0), then

$$\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$$

Q.22 A pair of straight line drawn through the origin form with the line 2x + 3y = 6 an isosceles, right angled triangle then

Statement (1): Area of the triangle is $\frac{36}{13}$

Statement (2): If ABC is a right angled isosceles triangle right angled at A, and AD is perpendicular from A to BC, then area of $\Delta ABC = (AD)^2$

Q.23 **Statement (1)** : Area enclosed by the lines represented by ± 2x ± 3y + 6 = 0 is 6..

Statement (2): Area enclosed by the lines represented by equation ± ax ± by + c = 0 is $\frac{2c^2}{|ab|}$

Q.24 **Statement (1)**: Point (–1, –1) and (3, 7) lies on the same side of line 3x – 8y – 7 = 0

Statement (2): If (x_1, y_1) and (x_2, y_2) lies on same side of line ax + by + c = 0 then $\frac{ax_1 + by_1 + c}{ax_2 + by_2 + c} > 0$.

Passage -1

A(0, 3), B (–2, 0) and C(6, 1) be the vertices of a triangle and M(β, β + 1) be a moving point then

Q.25 M lies on the curve

(A) y = x + 1 (B) $y = x^2$

(C) x = y + 1 (D) None of these

Q.26 If M and A lie on same side of BC then

(A) $\beta > 2$ (B) $\beta < 2$

(C) $\beta > -\frac{6}{7}$ (D) $\beta < \frac{3}{4}$

Q.27 M lies within ΔABC if

(A) $-\frac{6}{7} < \beta < 4$ (B) $-4 < \beta < -\frac{6}{7}$

(C) $-\frac{6}{7} < \beta < \frac{3}{2}$ (D) None of these

Passage-2

Given the equations of two sides of a square as $5x + 12y – 10 = 0$, $5x + 12y + 29 = 0$. Also given is a point M(–3, 5) lying on one of its sides. Answer the following questions

Q.28 The number of possible squares must be

(A) one (B) two

(C) four (D) None of these

Q.29 The area of the square must be

(A) 9 units (B) 6 units

(C) 5 units (D) None of these

Q.30 If the possible equations of the remaining sides is $12x – 5y + \lambda = 0$ then λ cannot be-

(A) 61 (B) 22

(C) 100 (D) 36

ANSWER KEY

Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Ans.	D	C	C	A	A	C	A	A	B	D
Que.	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	B	C	D	B	B	D	A	D	C	D
Que.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
Ans.	A	A	D	A	A	C	C	B	A	D