MATHS

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TWO DIMENSIONAL ANALYTICAL GEOMETRY

Worked Examples

1. Find the locus of a point which moves such thet its distance from the x axis is twice the distance from y axis.

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2. If θ is a parameter,find the equation of the locus of a moving point whose coordinates are a cosθ,b sinθ.

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3. Find the path traced by a point P such that in distance from two fixed points (2,3) and (-1,4) are always equal.

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4. Find the path traced by the point $(at^2, 2at)$ where t is the parameter and a is a constant.

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5. Find the locus of the centroid of the triangle OAB with vertices origin and two other points Aand B where AB = 12 cms given that A is x-axis and B is on Y-axis.

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6. If θ is a parameter,find the equation of the locus of a moving point whose coordinates are $\left(\alpha \cos^3 \theta, \alpha \sin^3 \theta\right)$.

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7. Find the slope of the line joining (2,-1) and (-4,5).

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8. A line is inclined at angle of 135° having y intercept as 3.

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9. If (5,-2),(-2,1) and (9,6) are collinear find α.

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10. A train is of length 300m moving with a constant velocity of 25m/s find

Q (i) the equation oof moton

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11. A train is of length 300m moving with a constant velocity of 25m/s find

Q (ii) time taken to cross a pole

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12. A train is of length 300m moving with a constant velocity of 25m/s find

Q (iii) the taken to cross a bridge of length 125m.

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13. The demand function is 4y-x=20 and the supply function is y+x=40,find

Q (i) market equilibrium

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14. The demand function is 4y-x=20 and the supply function is y+x=40,find

Q (ii) when price y=8 what is the demand.

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15. The demand function is 4y-x=20 and the supply function is y+x=40,find

Q (iii) where x=16 find the price.

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16. Using the principle of analytical geometry find 10^{th} term in an AP given that 3^{rd} term is 12 and 5^{th} term is 32.

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17. Find the equation of a straight line passing through the point (-3,2) and cutting off equal intercepts on the cooredinate axes.

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18. Find the equartion of straight lines, making a y intercept of 3 units and the angle between the line and the y axis is 60°.

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19. Two vertices of a triangle are (3,1) (-6,5) and the centroid is at the origin. Find the third vertex of the triangle.

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20. Area of the formed by a line with coordinate axes is $10\sqrt{3}$ sq.units.Find equation of the line if the perpendicular drawn from the origin to the line makes an angle of 30° with positive side of the x axis.

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21. The length of the perpendicular drawn from the origin to a line is 6 and makes an angle of 135° with positive x axis. Find the equation of the line.

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22. Express the equation $x + \sqrt{3}y - 4 = 0$ in

Q (i) slope intercept form.

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23. Express the equation $x + \sqrt{3}y - 4 = 0$ in

Q (ii) normal form.

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24. Express the equation $x + \sqrt{3}y - 4 = 0$ in

Q (iii) intercept form.

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25. Deduce $\sqrt{3}x - y + 4$ in normal form.

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26. An object was lanuched at a place Pin consatant speed to hit a traget at A.AT the 5 minute it was 400m away from the target out at the 8 minute it was 100m way

Q(i)the distance of the target from the place.

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27. An object was lanuched at a place Pin consatant speed to hit a traget at A.AT the 5 minute it was 400m away from the target out at the 8 minute it was 100m way

Q(ii)the disatnce covered in 3 minute

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28. An object was lanuched at a place Pin consatant speed to hit a traget at A.AT the 5 minute it was 400m away from the target out at the 8 minute it was 100m way

Q(iii)time taken to hit the target.

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29. Find the equation of a line through (-1,3)parallel to the line x-2y+5=0

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30. Find the equation of a line through (-1,3) perpendicular to the line 2x + 3y + 1 = 0.

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31. Find the equation of a line through (-1,3)(a) parallel to the line joining (-2, 1) and (2,3), (b) perpendicular to the line joining (3,-2), (1,0).

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32. If the lines $x+2y+5=0$ and $4x+ky+1=0$are perpendicular, find k.

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33. Find the distance (i) between the points (6,-2) and (-3, 1), (ii) from a point (2, 3) to the line $3x-4y+1=0$,

(iii) between the parallel lines $4x + 3y + 1 = 0$ and $8x - 6y + 5 = 0$.

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34. Find the nearest point on the line $3x+4y=2$ from the origin.

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35. Find the equation of the bisectors of the anglebetween the lines $4x+3y=5$ and $x +2y+3=0$.

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36. Find the points on the line $x + y = 1$ that lie at a distance 3 units from the line $5x+12y = 3$.

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37. Find the equation of the line through the intersection of lines $3x+2y-5=0$and $4x-y-3=0$and is parallel to $3x+y+2=0$

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38. Find the equation of the line through the intersection of lines $3x+2y-5=0$and $4x-y-3=0$and is

parallel to $3x+y+2=0$ is perpendicular to the line $7x+3y-4=0$

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39. A car rental company charges Rs50 for the first 6 kms and 10 for every additional km. Find the equation relating the cost y to the no. of kms x. Find also the cost to travel 25 km.

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40. A ray of light coming from the point (1,2)axis and is reflected at a point A on the coordinates passes

through (6,5). Find the coordinate of A

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41. Find atleast two equations of the straight lines in the family of the lines y=5x+b, for which b and the x-coordinate of the point of intersection of the lines with 3x-4y=6 are integers.

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42. Find the combined equation of the line $x + 2y = 5$ and $2x - y = 1$.

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43. Separate the equation $9x^2 + 19xy + 2y^2 = 0$

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44. Separate the equation of the line $x^2 + xy + y^2 = 0$

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45. Find the separate equations of the lines given by $2x^2 + 5xy + 2y^2 + 9x + 6y + 4 = 0$

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46. Find the equation of pair of lines through the origin and perpendicular to the pair of lines $2x^2 + 11xy + 12y^2 = 0$

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47. Show that the line $x^2 - 4xy + y^2 = 0$ and $x + y = 3$ from an equilateral triangle.

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48. Find the angle between the pair of straight lines given by

$$\left(a^2-3b^2\right)x^2+8abxy+\left(b^2-3a^2\right)y^2=0$$

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49. Find k such that the equation $12x^2+7xy-12y^2-x+7y+k=0$ represents a pair of straight lines. Find the separate equations of the straight lines and also the angle between the lines.

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50. If $9x^2 + 24xy + 16y^2 + 21x + 28y + 6 = 0$ represents a pair of lines (i) show that they are parallel,(ii) find separate equation,(iii) find the distance between the parallel lines.

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51. Find the equation of pair of lines joining the origin to the points of intersection of the $2x + 3y - 2 = 0$ and $2x^2 - 5xy - 15y^2 + 4x + 6y = 0$. Find the angle between them.

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Solution To Exercise 6 1

1. Find the locus of P, if for all values of α, the co-ordinates of a moving point P is

$(9\cos\alpha, 9\sin\alpha)$

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2. Find the locus of P, if for all values of α, the co-ordinates of a moving point P is

$(9\cos\alpha, 9\sin\alpha)$

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3. Find the locus of a point P that moves at a constant distant of

two units from the X-axis

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4. Find the locus of a point P that moves at a constant distant of

three units from the Y-axis

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5. If θ is a parameter,find the equation of the locus of a moving point whose coordinates are

$(\alpha \cos^3 \theta, \alpha \sin^3 \theta)$.

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6. Find the value of k and b, if the points P(-3, 1) and Q(2, b) lie on the locus of $x^2 - 5x + ky = 0$.

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7. A straight rod of length 8 units slides with its ends A and B always on the x and y axes respectively. Find the locus of the mid point of the line segment AB.

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8. Find the equation of the locus of a point such that the sum of the squares of the distance from the points (3, 5), (1, -1) is equal to 20.

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9. Find the equation of the locus of the point P such that the line segment AB, joining the points A(1, -6) and B(4, -2), subtends a right angle at P.

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10. If O is origin and R is a variable point on $y^2 = 4x$, then find the equation of the locus of the mid-point of the line segment OR.

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11. The coordinates of a moving point P are $\left(\frac{a}{2}(\cos ec\theta + \sin\theta), \frac{b}{2}(\cos ec\theta - \sin\theta)\right)$, where θ is a variable parameter. Show that the equation of the locus P is $b^2x^2 - a^2y^2 = a^2b^2$.

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12. If P(2,-7) is a given point and Q is a point on $\left(2x^2 + 9y^2 = 18\right)$, then find the equations of the locus of the mid-point of PQ.

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13. If R is any point on the x-axis and Q is any point on they y-axis and P is a variable point on RQ with RP=b, PQ=a, then find the equation of locus of P.

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14. If the points P(6,2) and Q(-2,1) and R are the vertices of a ΔPQR and R is the point on the locus of $y = x^2 - 3x + 4$, then find the equation of the locus of centroid of ΔPQR.

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15. If Q is a point on the locus of $x^2 + y^2 + 4x - 3y + 7 = 0$, then find the equation of locus of P which divides segment OQ externally in the ratio 3:4, where O is origin.

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16. Find the points on the locus of points that are 3 units from x-axis and 5 units from the point (5,1).

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17. The sum of the distance of a moving point from the points (4,0) and (-4,0) is always 10 units. Find the equation to the locus of the moving point.

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Solution To Exercise 6 2

1. Find the equation of the lines passing through the point (1,1)

with y-intercept (-4)

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2. Find the equation of the lines passing through the point (1,1)

with slope 3

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3. Find the equation of the lines passing through the point (1,1)

and (-2,3)

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4. Find the equation of the lines passing through the point (1,1)

and the perpendicular from the origin makes an angle 60° with x-axis.

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5. If p(r,c) is mid-point of a line segment between the axes, then show that $\frac{x}{r} + \frac{y}{c} = 2$.

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6. Find the equation of the line passing through the point (1,5) and also divides co-ordinate axes in the ratio 3:10.

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7. If p is length of perpendicular from the origin to the line whose intercepts on the axes are a and b, then

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

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8. The normal boiling point of water is $100^\circ C$ or $212^\circ F$ and the freezing point of water is $0^\circ C$ or $32^\circ F$.

Find the linear relationship between C and F.

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9. The normal boiling point of water is $100^\circ C$ or $212^\circ F$ and the freezing point of water is $0^\circ C$ or

$32^\circ F$.

Find the value of C for $98.6^\circ F$

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10. The normal boiling point of water is $100^\circ C$ or $212^\circ F$ and the freezing point of water is $0^\circ C$ or $32^\circ F$.

Find the value of C for $98.6^\circ F$

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11. An object was launched from a place P in constant speed to hit a target. At the 15^{th} second it was 1400m

away from the target and the 18^{th} second 800m away.

Find

the distance between the place and the target

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12. An object was launched from a place P in constant speed to hit a target. At the 15^{th} second it was 1400m away from the target and the 18^{th} second 800m away.

Find

the distance covered by it in 15 seconds.

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13. An object was launched from a place P in constant speed to hit a target. At the 15^{th} second it was 1400m away from the target and the 18^{th} second 800m away. Find

time taken to hit the target.

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14. Population of a city in the years 2005 and 2010 are 1,35,000 and 1,45,000 respectively. Find the approximate population in the year 2015. (assuming that the growth of population is constant)

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15. Find the equation of the line, if the perpendicular drawn from the origin makes an angle 30° with x-axis and its length is 12.

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16. Find the equation of the straight lines passing through (8, 3) and having intercepts whose sum is 1.

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17. Show that the points (1, 3), (2, 1) and $\left(\frac{1}{2}, 4\right)$ are collinear, by using

concept of slope

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18. Show that the points (1, 3), (2, 1) and $\left(\frac{1}{2}, 4\right)$ are collinear, by using

using a straight line and

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19. Show that the points (1, 3), (2, 1) and $\left(\frac{1}{2}, 4\right)$ are collinear, by using

any other method.

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20. A straight line is passing through the point A(1,2) with slope $\frac{5}{12}$. Find points on the line which are 13 units away from A.

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21. A 150m long train is moving with constant velocity of 12.5 m/s. Find

the equation of the motion of the train,

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22. A 150m long train is moving with constant velocity of 12.5 m/s. Find

time taken to cross a pole

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23. A 150m long train is moving with constant velocity of 12.5 m/s. Find

The time taken to cross the bridge of length 850m is?

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24. A spring stretches by $0.020m$ when a 1.5 kg object is suspended from its end . How much mass should be attached to the spring so that its frequency of vibration is $f = 3.1Hz$?

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25. A spring was hung from a hook in the ceiling.A number of different weights were attached to the spring to make it strech, and the total length of spring was measured each time shown in the following table:

Q (iv) If the spring has to stretch to 9 cm long, how much weight should be added?

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26. A spring was hung from a hook in the ceiling.A number of different weights were attached to the spring to make it strech, and the total length of spring was measured each time shown in the following table:

Q (v) How long will the spring be when 6 kilograms of weight omn it?

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27. A family is using Liquefied petroleum gas (LPG) of weight $14.2kg$ for conumption.(Full weight $29.5kg$ includes the empty cylinders tare weight of $15.3kg$). If it is use with constant rate then it lasts for 24 days. Then the new cylinder is replaced

Q (i) Find the equation relating the quantity of gas in the cylinder to the days.

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28. In a shopping mall there is a hall of cuboid shape with dimemsion $800 \times 800 \times 720$units, which needs to be added the facility of an escalator in the path as shown by the dotted line in the fihure,Find

Q (i) the ,minimum total length of escalator.

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29. In a shopping mall there is a hall of cuboid shape with dimemsion $800 \times 800 \times 720$units, which needs to be added the facility of an escalator in the path as shown by the dotted line in the fihure,Find

Q (iii) the slopes of the escalator at the turning points.

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Solution To Exercise 6 3

1. Show that the lines are $3x+2y+9=0$ and $12x+8y-15=0$ are parallel lines.

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2. Find the equation of the straight line parallel to $5x-4y+3=0$ and having x-intercept 3.

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3. Find the distance between the line $4x+3y+4=0$ and a point (i) (-2, 4) (ii) (7, -3)

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4. Find the distance between the line $4x+3y+4=0$ and a point (i) (-2, 4) (ii) (7, -3)

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5. Write the equation of the lines through the point (1,-1)

parallel to $x+3y-4=0$

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6. Write the equation of the lines through the point (1,-1)

perpendicular to $3x+4y=6$

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7. If (-4,7) is one vertex of a rhombus and if the equation of one diagonal is $5x-y+7=0$, then find the equation of another diagonal.

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8. Find the equation of the lines passing through the point of intersection lines 4x-y+3=0 and 5x+2y+7=0 Parallel to x-y+5=0

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9. Find the equation of the lines passing through thye point of intersection lines $4x - y + 3 = 0$ and $5x + 2y + 7 = 0$ and

Q (ii) Parallel to $x - y + 5 = 0$

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10. Find the equation of the lines passing through the point of intersection lines $4x-y+3=0$ and $5x+2y+7=0$ Perpendicular to $x-2y+1=0$

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11. Find the equations of two straight lines which are parallel to the line $12x+5y+2=0$ and at a unit distance from the point $(1, -1)$.

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12. Find the equations of straight lines which are perpendicular to the line $3x+4y-6=0$ and are at a distance of 4 units from (2,1).

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13. Find the equation of a straight line parallel to $2x+3y=10$ and which is such that the sum of its intercepts on the axes is 15.

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14. Find the length of the perpendicular and the co-ordinates of the foot of the perpendicular from (-10,-2) to the line x+y-2=0.

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15. If p_1 and p_2 are the lengths of the perpendiculars from the origin to the straight lines $x\sec\theta + y\operatorname{cosec}\theta = 2a$ and $x\cos\theta - y\sin\theta = a\cos 2\theta$, then prove that ${p_1}^2 + {p_2}^2 = a^2$.

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16. Find the distance between the parallel lines

$12x+5y=7$ and $12x+5y+7=0$

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17. Find the distance between the parallel lines

$3x-4y+5=0$ and $6x-8y-15=0$

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18. Find the family of straight lines (i) Perpendicular (ii)

Parallel to $3x+4y-12=0$.

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19. Find the family of straight lines (i) Perpendicular (ii) Parallel to 3x+4y-12=0.

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20. If the line joining two points A(2,0) and B(3,1) is rotated about A in anticlockwise direction through an angle of 15°, then find the equation of the line in new position.

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21. A ray of light coming from the point (1,2) is reflected at a point A on the x-axis and it passes through the point (5,3). Find the co-ordinates of the point A.

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22. A line is drawn perpendicular to $5x=y+7$. Find the equation of the line if the area of the triangle formed by this line with co-ordinate axes is 10 sq. units.

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23. Find the of the image of the point (-2,3) about the line x+2y-9=0.

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24. Find all the equations of the straight lines in the family of the lines y=mx-3, for which m and the x - coordinate of the point of intersection of the lines with x-y=6 are integers.

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Solution To Exercise 6 4

1. Find the combined equation of the straight lines whose separate equations are x-2y-3=0 and x+y+5=0.

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2. Show that $4x^2 + 4xy + y^2 - 6x - 3y - 4 = 0$ represents a pair of parallel lines.

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3. Show that $2x^2 + 3xy - 2y^2 + 3x + y + 1 = 0$ represents a pair of perpendicular lines.

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4. Show that the equations $2x^2 - xy - 3y^2 - 6x + 19y - 20 = 0$ represents a pair of intersecting lines. Show further that the angle between them is $\tan^{-1}(5)$.

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5. Find the equation of the pair of straight lines passing through the point (1,3) and perpendicular to the lines 2x-3y+1=0 and 5x+y-3=0.

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6. Find the separate equation of the following pair of straight lines

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

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7. Find the separate equation of the following pair of straight lines

$6(x-1)^2 + 5(x-1)(y-2) - 4(y-2)^2 = 0$

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8. Find the separate equation of the following pair of straight lines

$2x^2 - xy - 3y^2 - 6x + 19y - 20 = 0$

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9. The slope of one of the straight lines $ax^2 + 2hxy + by^2 = 0$ is twice that of the other, show that $8h^2 = 9ab$.

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10. The slope of one of the straight lines $ax^2 + 2hxy + by^2 = 0$ is three times the other, show that $3h^2 = 4ab$.

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11. A ΔOPQ is formed by the pair of straight lines $x^2 - 4xy + y^2 = 0$ and the line PQ. The equation of PQ is x+y-2=0. Find the equation of the median of the triangle ΔOPQ drawn from the origin O.

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12. Find p and q, if the following equation represents a pair of perpendicular lines $6x^2 + 5xy - py^2 + 7x + qy - 5 = 0.$

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13. Find the value of k if the following equation represents a pair of straight lines. Further, find whether these lines are parallel or intersecting $12x^2 + 7xy - 12y^2 - x + 7y + k = 0.$

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14. For what value of k does the equation $12x^2 + 2kxy + 2y^2 + 11x - 5y + 2 = 0$ represent two straight lines.

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15. Show that the equation $9x^2 - 24xy + 16y^2 - 12x + 16y - 12 = 0$ represents a pair of parallel lines. Find the distance between them.

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16. Show that the equation $4x^2 + 4xy + y^2 - 6x - 3y - 4 = 0$ represents a pair of parallel lines. Find the distance between them.

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17. Prove that one of the straight lines given by $ax^2 + 2hxy + by^2 = 0$ will bisect the angle between the co-ordinate axes if $(a+b)^2 = 4h^2$.

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18. Prove that the straight lines joining the origin to the points of intersection of $3x^2 + 5xy - 3y^2 + 2x + 3y = 0$ and $3x - 2y - 1 = 0$ are at right angles.

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Solution To Exercise 6 5

1. The equation of the locus of the point whose distance from y-axis is half the distance from origin is

A. $x^2 + 3y^2 = 0$

B. $x^2 - 3y^2 = 0$

C. $3x^2 + 3y^2 = 0$

D. $3x^2 - 3y^2 = 0$

Answer: D

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2. Which of the following equation is the locus of $(at^2, 2at)$

A. $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

B. $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

C. $x^2 + y^2 = a^2$

D. $y^2 = 4ax$

Answer: D

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3. Which of the following point lie on the locus of $3x^2 + 3y^2 - 8x - 12y + 17 = 0$

A. (0,0)

B. (-2,3)

C. (1,2)

D. (0,-1)

Answer: C

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4. If the point (8,-5) lies on the locus $\frac{x^2}{16} - \frac{y^2}{25} = k$, then the value of k is

A. 0

B. 1

C. 2

D. 3

Answer: D

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5. Straight line joining the points (2,3) and (-1,4) passes through the point (α, β) if

A. $\alpha + 2\beta = 7$

B. $3aplha + \beta = 9$

C. $aplha + 3\beta = 11$

D. $3aplha + \beta = 11$

Answer: C

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6. The slope of the line which makes an angle 45 with the line 3x-y=-5 are

A. $1, -1$

B. $\frac{1}{2}, -2$

C. $1, \frac{1}{2}$

D. $2, \frac{-1}{2}$

Answer: B

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7. Equation of the straight line forms an isosceles triangle with coordinate axes in the I-quadrant with perimeter $4 + 2\sqrt{2}$ is

A. x+y+2=0

B. x+y-2=0

C. $x + y - \sqrt{2} = 0$

D. $x + y + \sqrt{2} = 0$

Answer: B

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8. The coordinate of the four vertices of a quadrilate are (-2,4),(-1,2),(1,2)and (2,4) taken in order. The equation of the line passing through the vertex(-1,2) and divbide the quadrilateral in the equal area is,

A. x+1=0

B. x+y=1

C. x+y+3=0

D. x-y+3=0

Answer: D

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9. The intercepts of the perpendicular bisector of the line segment joining (1,2) and (3,4) with coordinate axes are

A. 5,-5

B. 5,5

C. 5,3

D. 5,-4

Answer: B

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10. The equation of the line with slope 2 and the length of the perpendicular from the origin equal to $\sqrt{5}$ is

A. $x - 2y = \sqrt{5}$

B. $2x - y = \sqrt{5}$

C. 2x-y=5

D. x-2y-5=0

Answer: C

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11. A line perpendicular to the line 5x-y=0 form a triangle with the coordinate axes if the area of the triangle is 5 sq.units,then its equation is:

A. $x + 5y \pm 5\sqrt{2} = 0$

B. $x - 5y \pm 5\sqrt{2} = 0$

C. $5x + y \pm 5\sqrt{2} = 0$

D. $5x - y \pm 5\sqrt{2} = 0$

Answer: A

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12. Equation of the straight line perpendicular to the line x-y+5=0, through the point of intersection the y-axis and the given line

A. x-y-5=0

B. x+y--5=0

C. x+y+5=0

D. x+y+10=0

Answer: B

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13. If the equation of the base opposite to the vertex (2,3) of a equilateral triangle is x+y=2, then the length of a side is

A. $\sqrt{\frac{3}{2}}$

B. 6

C. $\sqrt{6}$

D. $3\sqrt{2}$

Answer: C

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14. The line $(p+2q)x+(p-3q)y=p-q$ for different values of p and q passes through the point

A. $\left(\frac{3}{2}, \frac{5}{2}\right)$

B. $\left(\frac{2}{5}, \frac{2}{5}\right)$

C. $\left(\frac{3}{5}, \frac{3}{5}\right)$

D. $\left(\frac{2}{5}, \frac{3}{5}\right)$

Answer: D

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15. The point on the line $2x-3y=5$ is equidistance from $(1,2)$ and $(3,4)$ is

A. $(7,3)$

B. $(4,1)$

C. $(1,-1)$

D. $(-2,3)$

Answer: B

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16. The image of the point $(2,3)$ in the line $y = -x$ is

A. (-3,-2)

B. (-3,2)

C. (-2,-3)

D. (3,2)

Answer: A

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17. The length of $\perp$ from the origin to the line $\frac{x}{3} - \frac{y}{4} = 1$ is

A. $\frac{11}{5}$

B. $\frac{5}{12}$

C. $\frac{12}{5}$

D. $-\frac{5}{12}$

Answer: C

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18. The y-intercept of the straight line passing through (1,3) and perpendicular to 2x-3y+1=0 is

A. $\frac{3}{2}$

B. $\frac{9}{2}$

C. $\frac{2}{3}$

D. $\frac{2}{9}$

Answer: B

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19. If the two straight lines $x + (2k - 7)y + 3 = 0$ and $3kx + 9y - 5 = 0$ are perpendicular then the value of k is

A. k=3

B. $k = \frac{1}{3}$

C. $k = \frac{2}{3}$

D. $k = \frac{3}{2}$

Answer: A

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20. If a vertex of a square is at the origin and its one side lies along the line $4x+3y-20=0$, then the area of the square is

A. 20sq.units

B. 16sq.units

C. 25sq.units

D. 4sq.units

Answer: B

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21. If the lines represented by the equation $6x^2 + 41xy - 7y^2 = 0$ make angle α and β with x-axis, then $\tan\alpha \tan\beta =$

A. $-\frac{6}{7}$

B. $\frac{6}{7}$

C. $-\frac{7}{6}$

D. $\frac{7}{6}$

Answer: A

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22. The area of the triangle formed by the lines $x^2 - 4y^2 = 0$ and $x = a$ is

A. $2a^2$

B. $\sqrt{\frac{3}{2}a^2}$

C. $\frac{1}{2}a^2$

D. $\frac{2}{\sqrt{3}}a^2$

Answer: C

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23. If one of the line given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then c equals to

A. -3

B. -1

C. 3

D. 1

Answer: A

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24. θ is acute angle between the lines $x^2 - xy - 6y^2 = 0$, then $\dfrac{2\cos\theta + 3\sin\theta}{4\sin\theta + 5\cos\theta}$ is

A. 1

B. $\dfrac{-1}{9}$

C. $\dfrac{5}{9}$

D. $\dfrac{1}{9}$

Answer: C

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25. The equation of one of the line represented by the equation $x^2 + 2xy\cot\theta - y^2 = 0$ is

A. $x - y\cot\theta = 0$

B. $x - y\tan\theta = 0$

C. $x - y\cos\theta + y(\sin\theta + 1) = 0$

D. $x - y(\sin\theta + y(\cos\theta + 1) = 0$

Answer: D

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Problem For Practice Answer The Following Questions

1. Find the equation of the line through the point of intersection of the line $5x-6y=1$ and $3x+2y+5=0$ and cutting off equal intercepts on the coordinate axis,

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2. Find the value of p for which the lines $8px+(2-3p)y+1=0$ and $px+8y+7=0$ are perpendicular.

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3. Find the equation of the line through $(1,2)$ and which is perpendicular to the line joining $(2,-3)(-1,5)$

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4. Find the equation of the median of the traingle where vertices (-5,2)(4,-6)(1,7).show that they are comment

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5. Show that the traingle whose sides are y=2x+7,x-3y-6=0and x+2y=8 is right angled.

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6. Find the equation of straight line joining the points of intersection of the lines $3x+2y+1=0$ and $x+y=3$ to the intersection of the lines $y-x=1$ and $2x+y+2=0$

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7. Find the equation of the straight line through the intersection of $5x-6y=1$ and $3x+2y+5=0$ and perpendicular to the straight line $3x-5y+11=0$

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8. Show that the traingle formed by staright lines $4x-3y-18=0, 3x-4y+16=0$ and $x+y-2=0$ is isosceles

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9. A point p moves such that p and the points (2,3)(1,5) are always collinear. Show that the locus of p is $2x+y-7=0$

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10. Find the value of a for which the straight lines $x+y-4=0, 3x+2=0$ and $x-y+3a=0$ are concurrent.

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11. Show that x^(2)-y^(2)+x-3y-2=0repersent a pair of straight lines. Find also angle between the lines

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12. Show that if one of angle betwwen pair of straight lines $ax^2 + 2hxy + by^2 = 0$ is 60° then $(a + 3b)(3a + b) = 4h^2$

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13. Find the angle between the lines

$3x^2 + 10xy + 8y^2 + 14x + 22 + 15 = 0$

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Problem For Practice Choose The Correct Option

1. If P(a,b) is the mid point of a line segment between the axes, then:

A. $\frac{x}{a} + \frac{y}{b} = 1$

B. $\frac{x}{a} + \frac{y}{b} = 2$

C. $\frac{x}{a} + \frac{y}{b} - 1 = 0$

D. $\frac{x}{a}+\frac{y}{b}-2=0$

Answer: B

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2. The normal form of $\sqrt{3}x+y=4$ is:

A. $x\frac{\cos(\pi)}{4}+y\frac{\sin(\pi)}{4}=1$

B. $x\frac{\cos(\pi)}{6}+y\frac{\sin(\pi)}{6}=2$

C. $x\frac{\cos(\pi)}{4}+y\frac{\sin(\pi)}{4}-1=0$

D. $x\frac{\cos(7\pi)}{6}+y\frac{\sin(7\pi)}{6}=2$

Answer: B

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3. If (7,x) (-3,3) (2,2) are collinear then the value of x is:

A. 4

B. 0

C. -1

D. 1

Answer: D

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4. If θ is a parameter, then the locus of a moving point whose coordinates are $x = \alpha \cos^2 \theta, y = \alpha \sin^2 \theta$ is:

A. $x + y = \alpha$

B. $x + y + \alpha = 0$

C. $x^2 + y^2 = \alpha^2$

D. none of these

Answer: A

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5. The line which is perpendicular to $3x - 4y + 1 = 0$ is:

A. $6x + 2y + 1 = 0$

B. $3x - 4y + 5 = 0$

C. $4x + 3y + 1 = 0$

D. $4x + 3y + 2 = 0$

Answer: D

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6. The line $2x + 3y = 5, 2x + y = k, 2x - y - 1 = 0$

A. 1

B. 5

C. 3

D. -3

Answer: C

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7. The line $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ are perpendicular if:

A. $a_1b_2 = a_2b_1$

B. $a_1b_2 = -a_2b_1$

C. $a_1a_2 + b_1b_2 = 0$

D. $a_1a_2 - b_1b_2 = 0$

Answer: C

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8. The perpendicular distance from (1,2) to the line $5x + 12y - 3 = 0$ is:

A. 2

B. 3

C. 4

D. 5

Answer: A

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9. Find the nearest point on the line $3x + y = 10$ from the origin is:

A. (1,3)

B. (3,1)

C. (-1,-3)

D. (-3,-1)

Answer: B

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10. The condition that the pair of straight lines $ax^2 + 2xy + by^2 = 0$ are parallel is:

A. $h^2 + ab = 0$

B. $h^2 - ab = 0$

C. $a + b = 0$

D. $a - b = 0$

Answer: B

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11. Figure

	Information given	Equation of the straight line
11.	Slope (m) & y intercept c	(a) $\frac{x-x_1}{\cos\theta}=\frac{y-y_1}{\sin\theta}=r$
12.	Slope m & point (x_1, y_1)	(b) $y-y_1=m(x-x_1)$
13.	Two points (x_1,y_1) & (x_2,y_2)	(c) $ax+by+c=0$
14.	x intercept (a) & y intercept (b)	(d) $y=mx+c$
15.	Length of perpendicular from origin to the line (p) and slope of this perpendicular (α)	(e) $\frac{x}{a}+\frac{y}{b}=1$
16.	Parametric form - r is the parameter	(f) $x\cos\alpha+y\sin\alpha=p$
17.	General equation of a straight lime	(g) $\frac{y-y_1}{y_2-y_1}=\frac{x-x_1}{x_2-x_1}$

18.	Slope of the line $2x - 3y + 5 = 0$	*(a)* 1
19.	Slope of the line joining $(2, -1)$ and $(1, -2)$	*(b)* 3
20.	Perpendicular distance from origin to the line $12x - 5y + 39 = 0$	*(c)* $\frac{2}{3}$
21.	y intercept of $x - 3y + 2 = 0$	*(d)* $\frac{2}{3}$

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12. Find the incorrect statement:

A. The path traced out by a moving point under certain conditions is called the locus of that point.

B. The locus of a point which moves equidistance from a fixed point in a circle.

C. The path traced out by the point $(ct, c/t)T \neq 0$, is the parameter and c is a constant in $xy = c^2 = 0$.

D. In a place three or more points are said to be collinear if they lie on the same straight line.

Answer: C

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13. Find the incorrect statement:

A. A pint P moves equidistance for two fixed lines ox and oy, then its locus is the angle bisector of the angle $x\hat{o}y$.

B. `The intercept of a line in the point at which the line crosses the y-axis.

C. $x\cos\alpha + y\sin\alpha = P$ is called normal form of equation where P is the length of normal from origin and α is the angle made by this normal x axis.

D. Two stright lines are parallel if they have equal slopes.

Answer: B

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14. Find the correct statement:

A. $2x - y + 5 = 0$ and $4x - 2y + 1 = 0$ are perpendicular.

B. The distance between (1,2) and (2,3) is $\sqrt{2}$ units.

C. Distance between the parallel lines $x + y = 1$ and $x + y = 5$ is $\frac{4}{\sqrt{2}}$.

D. The point of intersection of the lines $2x - y = 1$ and $3x + 4y = 7$ is (-1,-1)

Answer: B

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15. Find the correct statement:

A. The Slope of the line is $\frac{1}{2}$ and so the slope of perepndicular line is -1.

B. (4,5) lies on $2x - y = 5$

C. Pair of lines given by $2x^2 - 5xy - 2y^2 = 0$ are perpendicular to each other.

D. A pair of straight lines through the origin is a homogenous equation of degree three

Answer: C

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16. Find the odd one out:

A. slope

B. intercept

C. point of intersections

D. circle

Answer: D

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17. Find the odd one out:

A. a pair of lines

B. parallel lines if $m_1 = m_2$

C. perpendicular lines if $m_1 m_2 = -1$

D. concurrent lines.

Answer: D

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18. The locus of a moving point $P\left(a\cos^3\theta, a\sin^3\theta\right)$ is:

A. $x^{\frac{1}{3}}$+y^(2/3)=a^(2/3)`

B. $x^2 + y^2 = a^2$

C. $x + y = a$

D. $x^{\frac{3}{2}}$+y^(3/2)=a^(3/2)`

Answer: A

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19. AB=12cm. Ab sides with A on x-axis, B on y-axis respectively. Then the radius of the circle which is the locus of ΔAOB,where O is origin is:

A. 36

B. 4

C. 16

D. 9

Answer: B

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20. The equating straight line with y-intercept -2 and inclination with x-axis is 135° is:

A. $X + y - 2 = 0$

B. $y - x + 2 = 0$

C. $y + x + 2 = 0$

D. none

Answer: C

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21. The length of the perpendicular from origin to line is $\sqrt{3}x - y + 24 = 0$ is:

A. $2\sqrt{3}$

B. 8

C. 24

D. 12

Answer: D

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22. If (1,3) (2,1) (9,4) are collinear then a is:

A. $\frac{1}{2}$

B. 2

C. 0

D. $-\frac{1}{2}$

Answer: A

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23. The lines $x + 2y - 3 = 0$ and $3x - y + 7 = 0$ are:

A. parallel

B. neither parallel nor perpendicular

C. perepndicular

D. parallel as well as perpendicular

Answer: B

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24. Find the nearest point on the line $3x + y = 10$ from the origin is:

A. (2,1)

B. (1,2)

C. (3,1)

D. (1,3)

Answer: C

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25. The slope of the line joining A and B where A is (-1,2) and B is the point of intersection of the lines $2x + 3y = 5$ and $3x + 4y = 7$ is:

A. -2

B. 2

C. $\frac{1}{2}$

D. $-\frac{1}{2}$

Answer: D

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26. Find the angle between the lines $3x^2 - 10xy - 3y^2 = 0$:

A. 90°

B. 45°

C. 60°

D. 30°

Answer: A

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27. Find the point of intersection of the lines $2x^2 + xy + y^2 - 5x + 3y + 2 = 0$

A. (-1,-1)

B. (1,1)

C. (1,0)

D. (0,1)

Answer: B

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28. (i) If (1,-1) lies on $2x - 3y + k = 0$ the k is -5.

(ii) $2x - 3y + 11 = 0$ and $4x - 6y + 1 = 0$ are perpendicular.

(iii) Perpendicular distance from origin to the line $3x - 4y - 5 = 0$ is one unit.

(iv) Slope of the line $2x + 5y - 1 = 0$ is $\frac{1}{5}$.

State which of the folllowing are true.

A. (i) and (ii) are true

B. (i) and (iii) are true

C. (ii) and (iv) are true

D. (iii) and (iv) are true

Answer: B

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