MATHS

BOOKS - DEEPTI MATHS (TELUGU ENGLISH)

TRANSFORMATION OF AXES

Solved Examples

1. The point to which the axes to be translated to eliminate x and y terms in the equation

$3x^2 - 4xy - 2y^2 - 3x - 2y - 1 = 0$ is

A. $(-2, 1)$

B. $(-4, 3)$

C. $(-2, 3)$

D. $(1/10, -3/5)$

Answer: D

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2. The transformed equation of $x^2 + 2y^2 + 2x - 4y + 2 = 0$ when the axes are translated to the point $(-1, 1)$ is

A. $x^2 + 2y^2 = 1$

B. $x^2 + 3y^2 = 1$

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

D. $4x^2 + 9y^2 = 36$

Answer: A

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3. If the two circles $(x-1)^2+(y-3)^2=r^2$ and $x^2+y^2-8x+2y+8=0$ intersect at two distinct points, then

A. $(3\sqrt{3}, -5)$

B. $(-1, -5)$

C. $(5\sqrt{3}, -7)$

D. $(7-\sqrt{3})$

Answer: C

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4. The angle of rotation of axes to remove xy terms in the equation $9x^2 - 2\sqrt{3}xy + 3y^2 = 0$ is

A. $\pi / 12$

B. $\pi / 6$

C. $\pi / 3$

D. $5\pi / 12$

Answer: D

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5. The origin is shifted to (2,3) and then the axes are rotated through angle θ in the counter clock sense. If the equation $3x^2 + 2xy + 3y^2 - 18x - 22y + 50 = 0$ is transformed to $4x^2 + 2y^2 - 1 = 0$, then the angle θ =

A. $\frac{\pi}{6}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{4}$

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

Answer: C

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Excersie 1

1. The coordinates of the point (3,-5) in the new system when the origin is shifted to $(-2, 3)$ are

A. (-5,8)

B. (5,-8)

C. (4,6)

D. (3,1)

Answer: B

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2. If (7,5) are the coordinates of a point P in the new systems when the origin is shifted to (-5,3), then the original coordinates of P are

A. $(-1, 2)$

B. (1,-5)

C. (2,8)

D. (4,1)

Answer: C

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3. If $(\cos\alpha, \cos\beta)$ are the new coordinats of a point P when the axes are translated to the point (1,1) then the original coordinates of P are

A. $\left(2\cos^2\alpha/2, 2\cos^2\beta/2\right)$

B. $\left(2\sin^2\alpha/2, 2\sin^2\beta/2\right)$

C. $\left(2\cos\alpha/2, 2\cos\beta/2\right)$

D. $\left(2\sin\alpha/2, 2\sin\beta/2\right)$

Answer: A

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4. If the point (3,-2) is transformed to (-2,1) which the origin is shifted to P, then P=

A. (3,2)

B. (5,-3)

C. (-1,2)

D. (1,-2)

Answer: B

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5. The point to which the origin should be shifted in order to eliminate x and y in the equation $x^2 + y^2 + 8x - 6y + 25 = 0$ is

A. (1,3)

B. (-4,3)

C. (-1,2)

D. (1,-2)

Answer: B

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6. The point to which the origin should be shifted in order to eliminate x and y terms in the equation $4x^2 + 9y^2 - 8x + 36y + 4 = 0$ is

A. (1,3)

B. (-4,3)

C. (-1,2)

D. (1,-2)

Answer: D

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7. The point to which the origin should be shifted in order to eliminate x and y in terms in the equation $x^2 - y^2 + 2x + 4y = 0$ is

A. (1,3)

B. (-4,3)

C. (-1,2)

D. (1,-2)

Answer: C

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8. In order to eliminate the first degrees terms from the equation

$2x^2 + 4xy + 5y^2 - 4x - 22y + 7 = 0,$ the point to which origin is to be shifted is

A. (1,-3)

B. (2,3)

C. (-2,3)

D. (1,3)

Answer: C

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9. The point to which the origin should be shifted in order to eliminate x and y terms in the equation $2x^2 - 3y^2 - 12x - 6y + 5 = 0$ is

A. (3,1)

B. (1,5)

C. (1,-5)

D. (3,-1)

Answer: D

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10. The point to which the origin should be shifted in order to eliminate x and y in the equation $2(x-5)^2+3(y+7)^2=10$ is

A. (2,0)

B. (5,-7)

C. (2,-1)

D. (2,-3)

Answer: B

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11. If the origin is shifted to the point (2,-2), the equation to which the equation $(x-2)^2+(y+2)^2=9$ transformed is

A. $x^2+y^2=9$

B. $x^2+3y^2=1$

C. $x^2+y^2-2x+6y=0$

D. $4x^2+9y^2=36$

Answer: A

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12. If the equation $x^2 + y^2 - 4x - 6y - 12 = 0$ is transformed to $x^2 + y^2 = 25$ when the axes are transmitted to a point then the new coordinates of (-3,5) are

A. (-1,7)

B. (-5,2)

C. (1,-7)

D. (5,-2)

Answer: B

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13. The point to which the axes are to translated to eliminate y term and constant term in the equation $y^2 + 8x + 4y - 2 = 0$ is

A. (3,-2)

B. $(3, -2/3)$

C. $(3/4, -2)$

D. $(2/3, -4)$

Answer: C

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14. If the axes are translated to the circumcenter of the triangle formed by (9,3), (-1,7), (-1,3), then the centroid of the triangle in the new system is

A. $(5, 5/3)$

B. (4,3)

C. $(-5/3, -2/3)$

D. (0,0)

Answer: C

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15. The transformed equation of xy+2x - 5y -11=0 when the origin is shifted to the point (5,-2) is

A. xy=1

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

C. $2x^2 + 4xy + 5y^2 = 22$

D. $5x^2 + 4xy + 8y^2 = 9$

Answer: A

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16. The transformed equation of $x^2 + 3y^2 + 4x + 18y + 30 = 0$ when the axes are transferred to the point (-2,-3) is

A. $x^2 + 2y^2 = 1$

B. $x^2 + 3y^2 = 1$

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

D. $4x^2 + 9y^2 = 36$

Answer: B

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17. The transformed equation of $4x^2 + 9y^2 - 8x + 36y + 4 = 0$ when the axes are translated to the point (1,-2) is

A. $x^2 + 2y^2 = 1$

B. $x^2 + 3y^2 = 1$

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

D. $4x^2 + 9y^2 = 36$

Answer: D

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18. The transformed equation of $2x^2 + 4xy + 5y^2 - 4x - 22y + 7 = 0$ when the axes are translated to the point $(-2, 3)$ is

A. xy=1

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

C. $2x^2 + 4xy + 5y^2 = 22$

D. $5x^2 + 4xy + 8y^2 = 0$

Answer: C

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19. The transformed equation of $5x^2 + 4xy + 8y^2 - 12x - 12y = 0$ when the axes are translated to the point $(1, 1/2)$ is

A. xy=1

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

C. $2x^2 + 4xy + 5y^2 = 22$

D. `5x^(2) + 4xy + 8y^(2)=9

Answer: D

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20. If the first degree terms of $x^2 + 4xy + y^2 - 2x + 2y - 6 = 0$ are eliminated by translation of axes then the transformed equation is

A. $x^2 + 4xy + y^2 = 8$

B. $x^2 + 4xy + y^2 = 6$

C. $x^2 + 4xy + y^2 = 4$

D. $5x^2 + 4xy + 8y^2 = 9$

Answer: C

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21. If the transformed equation of a curve is $x^2 + y^2 + 4x + 6y + 12 = 0$ when the axes are translated to the point (2,3), then the original equaiton of the curve is

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

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

C. $x^2 - y^2 - 1 = 0$

D. $x^2 - y^2 - 1 = 0$

Answer: B

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22. If the area of a triangle is 5 s.u., then the area of the triangle when the origin is shifted to (2,-1) is

A. 2 s.u.

B. 3 s.u.

C. 4 s.u.

D. 5 s.u.

Answer: D

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23. The origin is shifted to (1,2). The equation $y^2 - 8x - 4y + 12 = 0$ changes to $y^2 = 4ax$ then a=

A. 1

B. 2

C. -2

D. -1

Answer: B

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24. By translating the axes the equation xy-x+2y=6 has changed to xy=c, then c =

A. 4

B. 5

C. 6

D. 7

Answer: A

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25. The condition that the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ can take the form $ax^2 - 2hxy + by^2 = 0$, when shifting the origi is

A. $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$

B. $2fgh - bg^2 - ch^2 = 0$

C. $2fgh - af^2 - ch^2 = 0$

D. $2fgh - af^2 - bg^2 = 0$

Answer: A

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26. If the axes are rotated through an angle 45°, the coordinates of $\left(2\sqrt{2}, -3/\sqrt{2}\right)$ in the new system are

A. $(3\sqrt{3}, -5)$

B. $(-1, -5)$

C. $(5\sqrt{3}, -7)$

D. $(7 - \sqrt{3})$

Answer: B

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27. If the coordinates of a pont P are transformed to $(\sqrt{2}, -\sqrt{2})$ when the axes are rotated through an angle 45°, then P

A. (2,0)

B. (-2,3)

C. (4,-6)

D. (4,-9)

Answer: A

28. Let A be the image of (2,-1) wr.to y-axis. Without transforming the origin, the axes are

turned through an angle of 45° in the clockwise direction. Then A in new system is

A. $(1/\sqrt{2}, 3/\sqrt{2})$

B. $(-1/\sqrt{2}, -3/\sqrt{2})$

C. $(-3/\sqrt{2}, 1/\sqrt{2})$

D. none

Answer: B

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29. If the axes are rotated through an angle 45° in the positive direction without changing the origin, then the coordinates of the point $(\sqrt{2}, 4)$ in the old system are

A. $(1 - 2\sqrt{2}, 1 + 2\sqrt{2})$

B. $(1 + 2\sqrt{2}, 1 - 2\sqrt{2})$

C. $(2\sqrt{2}, \sqrt{2})$

D. $(\sqrt{2}, 2)$

Answer: A

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30. If the coordiantes of a point P are transformed to $(2, -4\sqrt{3})$ when the axes are rotated through an angle 60°, then P=

A. $(3\sqrt{3}, 5)$

B. $(-1, -5)$

C. $(5\sqrt{3}, -7)$

D. $(7, -\sqrt{3})$

Answer: D

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31. The line joining the points $A(2, 0)$ and $B(3, 1)$ is rotated through an angle of 45°, about A in the anti-clockwise direction. The coordinates of B in the new position

A. $(2, \sqrt{2})$

B. $(\sqrt{2}, 2)$

C. (2,2)

D. $(\sqrt{2}, \sqrt{2})$

Answer: A

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32. The angle of rotation of axes in order to eliminate xy term in the equation $x^2 + 2\sqrt{3}xy - y^2 = 2a^2$ is

A. $\pi/6$

B. $\pi/4$

C. $\pi/3$

D. $\pi/2$

Answer: A

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33. The angle of rotation of axes in order to eliminate xy term in the equation $2x^2 + \sqrt{3}xy + 3y^2 = 9$ is

A. $\pi/6$

B. $\pi/4$

C. $\pi/3$

D. $\pi/2$

Answer: C

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34. The angle of rotation of axes to remove xy term in the equation $xy = c^2$ is

A. $\pi / 12$

B. $\pi / 6$

C. $\pi / 3$

D. $\pi / 4$

Answer: D

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35. The angle of rotation of axes to remove xy term in the equation $9x^2 + 2\sqrt{3}xy + 7y^2 = 10$ is

A. $\pi / 12$

B. $\pi / 6$

C. $\pi / 3$

D. $5\pi / 12$

Answer: B

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36. The angle of rotation of axes to remove xy term in the equation $x^2 + 4xy + y^2 - 2x + 2y - 6 = 0$ is

A. $\pi / 12$

B. $\pi / 6$

C. $\pi / 3$

D. $\pi / 4$

Answer: D

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37. The transformed equation of $x\cos\alpha + y\sin\alpha = p$ when the axes are rotated through an angle α is

A. x=p

B. y=p

C. x+p=0

D. y+p=0

Answer: A

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38. The transformed equation of $x \sin \alpha - y \cos \alpha = p$ when the axes are rotated through an angle α is

A. X=p

B. y=p

C. x+p=0

D. y+p=0

Answer: D

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39. The transformed equation of $2xy + a^2 = 0$ when the axes are rotated through an angle $\pi/4$ is

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

B. $xy = a^2$

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

D. $y^2 - x^2 = a^2$

Answer: C

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40. The transformed equation of $x^2 - y^2 = a^2$ when the axes are rotated through an angle $\pi/4$ in clockwise direction is

A. $2xy + a^2 = 0$

B. $xy = a^2$

C. $x^2 - 4y^2 = a^2$

D. $2y^2 - x^2 + a^2 = 0$

Answer: A

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41. The transferred equation of $x^2 + 6xy + 8y^2 = 10$ when the axes are rotated through an angle $\pi/4$ is

A. $15x^2 - 14xy + 3y^2 = 20$

B. $15x^2 + 14xy - 3y^2 = 20$

C. $15x^2 + 14xy + 3y^2 = 20$

D. $15x^2 - 14xy - 3y^2 = 20$

Answer: C

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42. The transformed equation of $x^2 + 4xy + y^2 - 2x + 2y - 6 = 0$ when the axes are rotated through an anlge $\pi/4$ is

A. $3x^2 - y^2 + 2\sqrt{2}y - 6 = 0$

B. $5x^2 + 3y^2 = 5$

C. $5x^2 + 3y^2 = 4$

D. $4x^2 + 3y^2 = 6$

Answer: A

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43. The transformed equation of $9x^2 + 2\sqrt{3}xy + 7y^2 = 10$ when the axes are rotated through an angle $\pi/6$ is

A. $3x^2 + y^2 + 2\sqrt{2}y - 6 = 0$

B. $5x^2 + 3y^2 = 5$

C. $5x^2 + 3y^2 = 4$

D. $4x^2 + 3y^2 = 6$

Answer: B

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44. The transformed equation of $x^2 - 2\sqrt{3}xy - y^2 = 2a^2$ when the axes are rotated through an angle 60° is

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

B. $xy = a^2$

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

D. $y^2 - x^2 = a^2$

Answer: D

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45. The transformed equation of $x^2 - 2\sqrt{3}xy - y^2 = 2a^2$ when the axes are rotated through an angle 60° is

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

B. $xy = a^2$

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

D. $y^2 - x^2 = a^2$

Answer: D

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46. When the axes are rotated through an angle $\pi/6$. Find the transformed equation of $x^2 + 2\sqrt{3}xy - y^2 = 2a^2$.

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

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

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

D. $x^2 - y^2 = 2a^2$

Answer: B

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47. The transformed equation of $x^2 - 2\sqrt{3}xy - y^2 = 2a^2$ when the axes are rotated through an angle 60° is

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

B. $xy = a^2$

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

D. $y^2 - x^2 = a^2$

Answer: A

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48. The transformed equation of $3x^2 + 3y^2 + 2xy = 2$ when the coordinate axes are rotated through an angle of 45° is

A. $x^2 + 2y^2 = 1$

B. $2x^2 + y^2 = 1$

C. $x^2 + y^2 = 1$

D. $x^2 + 3y^2 = 1$

Answer: B

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49. The transferred equation of $x^2 - y^2 + a^2 = 0$ when the axes are rotated through an angle 60° is

A. $x^2 + 2\sqrt{3}xy - y^2 = 2a^2$

B. $x^2 + 2\sqrt{3}xy + y^2 = 2a^2$

C. $xy + 2a^2 = 0$

D. $xy = 2a^2$

Answer: A

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50. The transformed equation of $x^2 + y^2 = a^2$ when the axes are rotated through an angle 18° is

A. $\sqrt{5}x^2 - 4xy + y^2 = a^2$

B. $x^2 + 2xy - \sqrt{5}y^2 = a^2$

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

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

Answer: D

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51. The transformed equation of $x^2 + y^2 = r^2$ when the axes are rotated through an angle 36° is

A. $\sqrt{5}x^2 - 4xy + y^2 = r^2$

B. $x^2 + 2xy - \sqrt{5}y^2 = r^2$

C. $x^2 - y^2 = r^2$

D. $x^2 + y^2 = r^2$

Answer: D

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52. The transformed equation of $x^2/a^2 - y^2/b^2 = 1$ when the axes are rotated through an angle 90° is

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

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

Answer: D

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53. The transformed equation of $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ when the axes are rotated through an angle 90° is

A.

$$bX^2 - 2hXY + aY^2 + 2fX - 2gY + c = 0$$

B.

$$bX^2 + 2hXY + aY^2 + 2fX + 2gY + c = 0$$

C.

$$bX^2 - 2hXY + aY^2 - 2fX + 2gY + c = 0$$

D. $bX^2 + 2hXY + aY^2 - 2gY + c = 0$

Answer: A

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54. The transformed equation of $x^2 + y^2 - 4x + 6y - 12 = 0$ when the axes are rotated through an angle 180° is

A. $X^2 + Y^2 + 4X - 6Y + 12 = 0$

B. $X^2 + Y^2 + 4X - 6Y - 12 = 0$

C. $X^2 + Y^2 - 4X - 6Y - 12 = 0$

D. $X^2 + Y^2 - 4X - 6Y + 12 = 0$

Answer: B

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55. If the axes are rotated through, an angle θ, the transformed equation of $x^2 + y^2 = 25$ is

A. $(x+y)^2=25$

B. $(x-y)^2=25$

C. $x^2-y^2=25$

D. $x^2+y^2=25$

Answer: D

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56. If the transformed equation of a curve is $17x^2-16xy+17y^2=225$ when the axes are

rotated through an angle 45°, then the original equation of the curve is

A. $25x^2 + 9y^2 = 225$

B. $9x^2 + 25y^2 = 225$

C. $25x^2 - 9y^2 = 225$

D. $9x^2 - 25y^2 = 225$

Answer: A

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57. If the transferred equation of a curve is $x^2 + 2\sqrt{3}xy - y^2 = 2a^2$ when the axes are rotated through an angle 60°, then the original equation of the curve is

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

B. $x^2 + y^2 - a^2 = 0$

C. $x^2 - y^2 + a^2 = 0$

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

Answer: C

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58. The angle of rotation of the axes so that the equation $\sqrt{3}x - y + 5 = 0$ may be reduced to the form Y = constant is

A. $\frac{\tan^{-1} b}{a}$

B. $\frac{\tan^{-1} a}{b}$

C. $\tan^{-1} a$

D. $\tan^{-1} b$

Answer: A

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59. The angle of rotation of the axes so that the equation $\sqrt{3}x - y + 5 = 0$ may be reduced to the form Y = constant is

A. $\pi / 6$

B. $\pi / 4$

C. $\pi / 3$

D. $\pi / 2$

Answer: C

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60. The angle of rotation of the axes so that the equation $x + y - 6 = 0$ may bre reduced in the form $x = 3\sqrt{2}$ is

A. $\pi / 6$

B. $\pi / 4$

C. $\pi / 3$

D. $\pi / 2$

Answer: B

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61. The line joining two points A(2,0), B(3,1) is rotated about A in anticlockwise direction through an angle 15°. If B goes to C then C=

A. $\left(2+\frac{1}{\sqrt{2}}, \sqrt{\frac{3}{2}}\right)$

B. $2\left(2-\frac{1}{\sqrt{2}}, \frac{\sqrt{3}}{2}\right)$

C. $\sqrt{2\left(-1, \frac{\sqrt{3}}{2}\right)}$

D. $\left(\sqrt{2}-\frac{1}{2}, \frac{\sqrt{2}}{3}\right)$

Answer: A

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62. The point $(4, 1)$ undergoes the following transformations successively

I. Reflection about the line $y = x$

II. Translation through a distance 2 units in the direction of positive X-axis.

III. Rotation through an angle $\frac{\pi}{4}$ about origin in the anticlock wise direction.

Then, the final position of the point is

A. $\left(-\sqrt{18}, \sqrt{18} \right)$

B. $(-2, 3)$

C. $(0, \sqrt{18})$

D. (0,3)

Answer: C

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63. The point P(1,3) undergoes the following transformations successively :

(i) Reflection with respect to the line y = x

(ii) Translation through 3 units along the

positive direction of the X-axis

(iii) Rotation through an angle of $\frac{\pi}{6}$ about the origin in the clockwise direction. The final position of the point P is

A. $\left(\frac{7}{\sqrt{2}}, -\frac{5}{\sqrt{2}}\right)$

B. $\left(\frac{6+\sqrt{3}-1}{2}, \frac{6+\sqrt{3}}{2}\right)$

C. $\left(\frac{6\sqrt{3}-1}{2}, \frac{6+\sqrt{3}}{2}\right)$

D. $\left(\frac{6\sqrt{3}+1}{2}, \frac{\sqrt{3}-6}{2}\right)$

Answer: D

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64. The origin is translated to (1,2) . The point (7,5) in the old system undergoes the following transformations successively.

(i) Moves to the new point under the given translation of origin

(ii) Translated through 2 units along the negative direction of the new X-axis

(iii) Rotated through an angle $\frac{\pi}{4}$ about the origin of new system in the clockwise direction

The final position of the point (7,5) is

A. $\left(\frac{9}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$

B. $\left(\frac{7}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$

C. $\left(\frac{7}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$

D. $\left(\frac{5}{\sqrt{2}}, -\frac{1}{\sqrt{2}}\right)$

Answer: C

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Set 1

1. If the point (3,-2) is transformed to (-2,1) which the origin is shifted to P, then P=

A. only 1 is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer: A

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2. The point to which the origin should be shifted in order to eliminate x and y terms in the equation $4x^2 + 9y^2 - 8x + 36y + 4 = 0$ is

A. only 1 is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer: B

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3. The transformed equation of $2x^2 + 4xy + 5y^2 - 4x - 22y + 7 = 0$ when the axes are translated to the point $(-2, 3)$ is

A. only 1 is true

B. only II is true

C. both I and II are true

D. neither I nor II are true

Answer: C

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Set 2

1. If the transformed equation of $6x^2 + 5xy - 6y^2 = 0$ when the axes are translated to the pont (-1,-1) is $6X^2 + 5XY - 6Y^2 + aX + bY + c = 0$ then the descending order of a,b,c is

A. a,b,c

B. b,c,a

C. a,c,b

D. c,a,b

Answer: A

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2. If the transformed equation of a curve is $3X^2 + XY - Y^2 - 7X + Y + 7 = 0$ when the axes are translated to the point (1,2), then the original equation of the curve is $3x^2 + xy - y^2 - ax + by + c = 0$, then the ascending order of a,b,c is

A. a,b,c

B. b,c,a

C. a,c,b

D. c,a,b

Answer: B

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3. The transformed equation of $x^2 + 4xy + y^2 - 2x + 2y - 6 = 0$ when the axes are rotated through an anlge $\pi/4$ is

A. a,b,c

B. b,c,a

C. a,c,b

D. c,a,b

Answer: D

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Set 3

1. To remove the first degree terms in the following equation origin should be shifted to the another point then calculate the new

origins is

I. $x^2 - y^2 + 2x + 4y = 0$
II. $4x^2 + 9y^2 - 8x + 36y + 4 = 0$
III. $x^2 + 3y^3 - 2x + 12y + 1 = 0$
IV. $2(x - 5)^2 + 3(y + 7)^2 = 10$

a) $(5, -7)$
b) $(1, -2)$
c) $(-1, 2)$
d) $(-1, -2)$
e) $(-5, 7)$

A. d,b,a,c

B. e,c,b,d

C. c,b,d,a

D. d,c,b,a

Answer: C

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2. Match the following

I. The transformed equation of $x^2 - y^2 + 2x + 4y = 0$ when the origin is shifted to the point $(-1, 2)$ is	a) $x^2 + 3y^2 = 1$
II. The transformed equation of $x^2 + 3y^2 + 4x + 18y + 30 = 0$ when the axes are translated to $(-2, -3)$ is	b) $x^2 - y^2 + 3 = 0$
III. The transformed equation of $4x^2 + 9y^2 - 8x + 36y + 4 = 0$ when the axes are translate to $(1, -2)$ is	c) $4x^2 + 9y^2 = 36$
	d) $2x^2 + 4xy + 5y^2 = 22$

The transformed equation of $2x^2 + 4xy + 5y^2 - 22y + 7 = 0$ when the axes are translated to $(-2, 3)$ is

e) $2x^2 + 4xy + 5y^2 = 11$

A. b,a,c,e

B. a,b,c,d

C. a,b,c,e

D. b,a,c,d

Answer: D

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Set 4

1. A: The transformed equation of $x^2 - y^2 + 2x + 4y = 0$ when the origin is shifted to the point (-1,2) is $X^2 - Y^2 + 3 = 0$.

R: If x,y terms are elimianted form $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ by shifting the origin to (α, β) then the transformed equation is $ax^2 + 2hxy + by^2 + g\alpha + f\beta + c = 0$

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true but R is not the correct explanation of A.

C. A is true but R is false

D. A is false but R is false

Answer: A

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2. A: The angle of rotation to remove the xy-term in the equation $2x^2 + \sqrt{3}xy + 3y^2 = 9$ is $\pi/6$.

R: The angle of rotation of the axes to eliminate xy term in the equation.

$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ is $\frac{1}{2}\tan^{-1}((2h)/(a-b))$

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true but R is not the correct explanation of A.

C. A is true but R is false

D. A is false but R is false

Answer: D

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3. A: If the transformed equation of a curve is $9X^2 + 16Y^2 = 144$ when the axes are rotated through an angle 45°, then the original equation is $25x^2 - 14xy + 25y^2 = 288$.

R: If f(x,y)=0 is the transformed equation of a

curve when the axes are rotate through an angle θ then the original equation of the curve is $f(x\cos\theta + y\sin\theta,\ -x\sin\theta + y\cos\theta) = 0$

A. Both A and R are true and R is the correct explanation of A.

B. Both A and R are true but R is not the correct explanation of A.

C. A is true but R is false

D. A is false but R is false

Answer: A

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