Transformation

1. Find the new equation of the curve $x^2 + y^2 - 4x + 6y - 3 = 0$ if the origin is moved to the point (2,-3).
2. Translate the origin to the fixed point (2,-3), the equation of a circle is changed to $x^2 + y^2 = 16$. Find the equation of this circle before translation
3. Using translation of axes, the equation $x^2 + y^2 - 6x + 12y - 4 = 0$ is changed to $x^2 + y^2 - 49 = 0$, find the new origin in the old coordinate system
4. Rotation anticlockwise through an angle of $\frac{\pi}{6}$, find the new coordinates of the point (-1,$\sqrt{3}$)
5. Find the equation of the curve obtained by rotating the curve $\frac{x^2}{2} + y^2 = 1$ clockwise through an angle of $\frac{\pi}{2}$ about the origin
6. The new equation of the curve obtained by rotating the curve $x^2 + \frac{y^2}{2} = 1$ through an angle of θ about the origin is $\frac{x'^2}{2} + y'^2 = 1$. Find the possible values of θ where $-\pi \leq \theta \leq \pi$
7. Identify the curve $73x^2 + 72xy + 52y^2 + 30x - 40y - 75 = 0$
8. Find the XY-coordinates of the given point if the axes are rotated through specific angle
   a. (1,4) , 30°
   b. (-2,4), 60°
9. Use rotation of axes to identify and simplify
   a. $x^2 - 2xy + y^2 - x - y = 0$
   b. $x^2 + xy + y^2 = 1$
   c. $97x^2 + 192xy + 153y^2 = 225$
   d. $2\sqrt{3}xy - 2y^2 - \sqrt{3}x - y = 0$
10. Use rotation of axes to show that the equation $36x^2 + 96xy + 64x^2 + 20x - 15y + 25 = 0$ represents a parabola. Find the XY-coordinates of the focus. The find the xy-coordinates of the focus
11. Write the equation $xy - 1 = 0$ in standard form
12. Simplify the graph of $7x^2 - 6\sqrt{3}xy + 13y^2 - 16 = 0$
13. Simplify the graph of $x^2 - 4xy + 4y^2 + 5\sqrt{5}y + 1 = 0$
14. Using translation of axes, the equation $xy - 2x + 3y + 5 = 0$ is changed to $xy + 11 = 0$, what is the new origin
15. Using translation of axes, the equation $4x^2 + 9y^2 - 8x + 18y - 23 = 0$ is changed to $4x^2 + 9y^2 = 36$, find the new origin
16. Translate the origin to fixed point (2,-1), the find the new equation $x^2 - y^2 - 4x - 2y - 1 = 0$
17. Find the new equation of the curve $x^2 - y^2 - 2x - 4y - 11 = 0$ if the origin is moved to the point (1,-2)
18. Find the equation of the curve obtained by rotating the hyperbola $xy = \frac{1}{2}$ clockwise through an angle of $\frac{1}{4}\pi$ about the origin
19. A straight line $3x + 4y = 12$ rotates about the origin through an angle of 180°. Find the new equation
20. Find the new equation of the curve $xy = 1$ if the axes are rotated anticlockwise through $45°$