Computer Graphics and Image Processing

Give an algorithm for drawing the part of a circle which lies in the first octant. Assume that the circle has integer radius and is centered at the origin. Assume that you have a function `setpixel(x, y)` which turns on pixel `(x, y)`. [10 marks]

Derive a matrix, or a product of matrices, to perform a clockwise 2D rotation of arbitrary angle, \( \theta \), about an arbitrary point, \((x_c, y_c)\). [4 marks]

Provide an algorithm to ascertain whether the Bezier curve defined by \( P_1P_2P_3P_4 \) lies within some tolerance, \( \epsilon \), of the straight line segment, \( \overline{P_1P_4} \), which joins the Bezier curve’s end points. Your algorithm must return `false` if the Bezier curve is outside the tolerance; it must return `true` if the curve is well inside the tolerance; it may return either `true` or `false` if the curve is inside, but not well inside, the tolerance. [6 marks]