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 $P_1 P_2 P_3 P_4$ lies within some tolerance, $\epsilon$, of the straight line segment, $P_1 P_4$, 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]