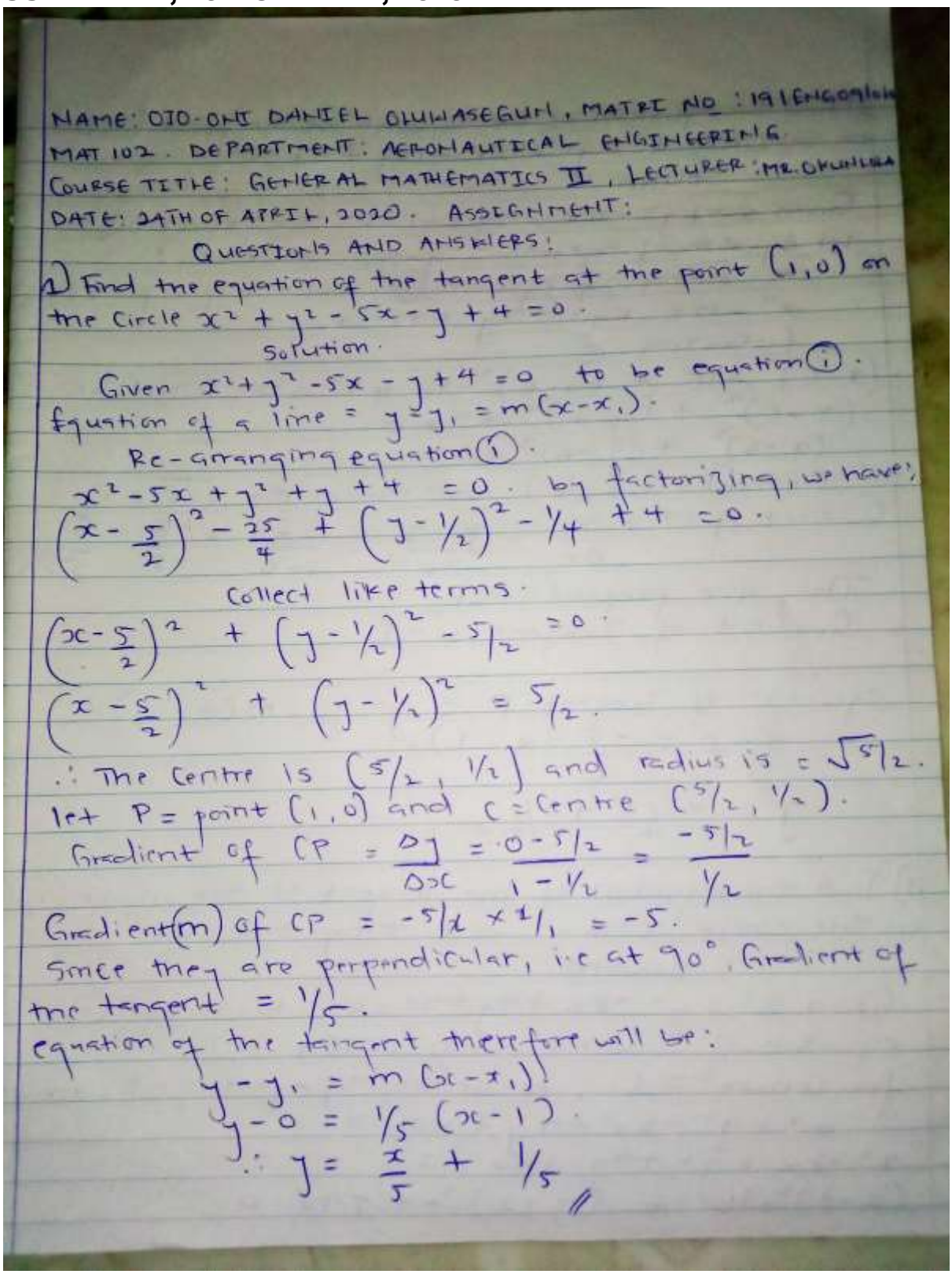
NAME: OJO-ONI DANIEL OLUWASEGUN, MATRIC NO.; 19/ENG09/016, DEPARTMMENT; AERONAUTICAL ENGINEERING, COURSE, MAT 102 GENERAL MATHEMATICS II, LECTURER; MR. OKUNLOLA, DATE SUBMITTED; 20TH OF APRIL, 2020.



NAME: OJO-ONI DANIEL OLUWASEGUN, MATRI NO: 19/ENG09/016
MAT 102. DEPARTMENT: AERONAUTICAL ENGINEERING
COURSE TITLE: GENERAL MATHEMATICS II, LECTURER: MR. OKUNLOLA
DATE: 24TH OF APRIL, 2020. ASSIGNMENT:

QUESTIONS AND ANSWERS:

1) Find the equation of the tangent at the point $(1,0)$ on the circle $x^2 + y^2 - 5x - y + 4 = 0$.

Solution.

Given $x^2+y^2-5x-y+4=0$ to be equation (i).

Equation of a line $= y - y_1 = m(x - x_1)$.

Re-arranging equation (i).

$x^2 - 5x + y^2 + y + 4 = 0$. by factorizing, we have;

$\left(x - \frac{5}{2}\right)^2 - \frac{25}{4} + \left(y - \frac{1}{2}\right)^2 - \frac{1}{4} + 4 = 0.$

Collect like terms.

$\left(x - \frac{5}{2}\right)^2 + \left(y - \frac{1}{2}\right)^2 - \frac{5}{2} = 0.$

$\left(x - \frac{5}{2}\right)^2 + \left(y - \frac{1}{2}\right)^2 = \frac{5}{2}.$

$\therefore$ The Centre is $\left(\frac{5}{2}, \frac{1}{2}\right)$ and radius is $= \sqrt{\frac{5}{2}}$.

Let P = point $(1,0)$ and C = Centre $\left(\frac{5}{2}, \frac{1}{2}\right)$.

Gradient of CP $= \frac{\Delta y}{\Delta x} = \frac{0 - \frac{5}{2}}{1 - \frac{1}{2}} = \frac{-\frac{5}{2}}{\frac{1}{2}}$

Gradient(m) of CP $= -\frac{5}{2} \times \frac{2}{1} = -5.$

Since they are perpendicular, i.e at 90°, Gradient of the tangent $= \frac{1}{5}$.

equation of the tangent therefore will be:

$y - y_1 = m(x - x_1)$

$y - 0 = \frac{1}{5}(x - 1)$

$\therefore y = \frac{x}{5} + \frac{1}{5}$ //

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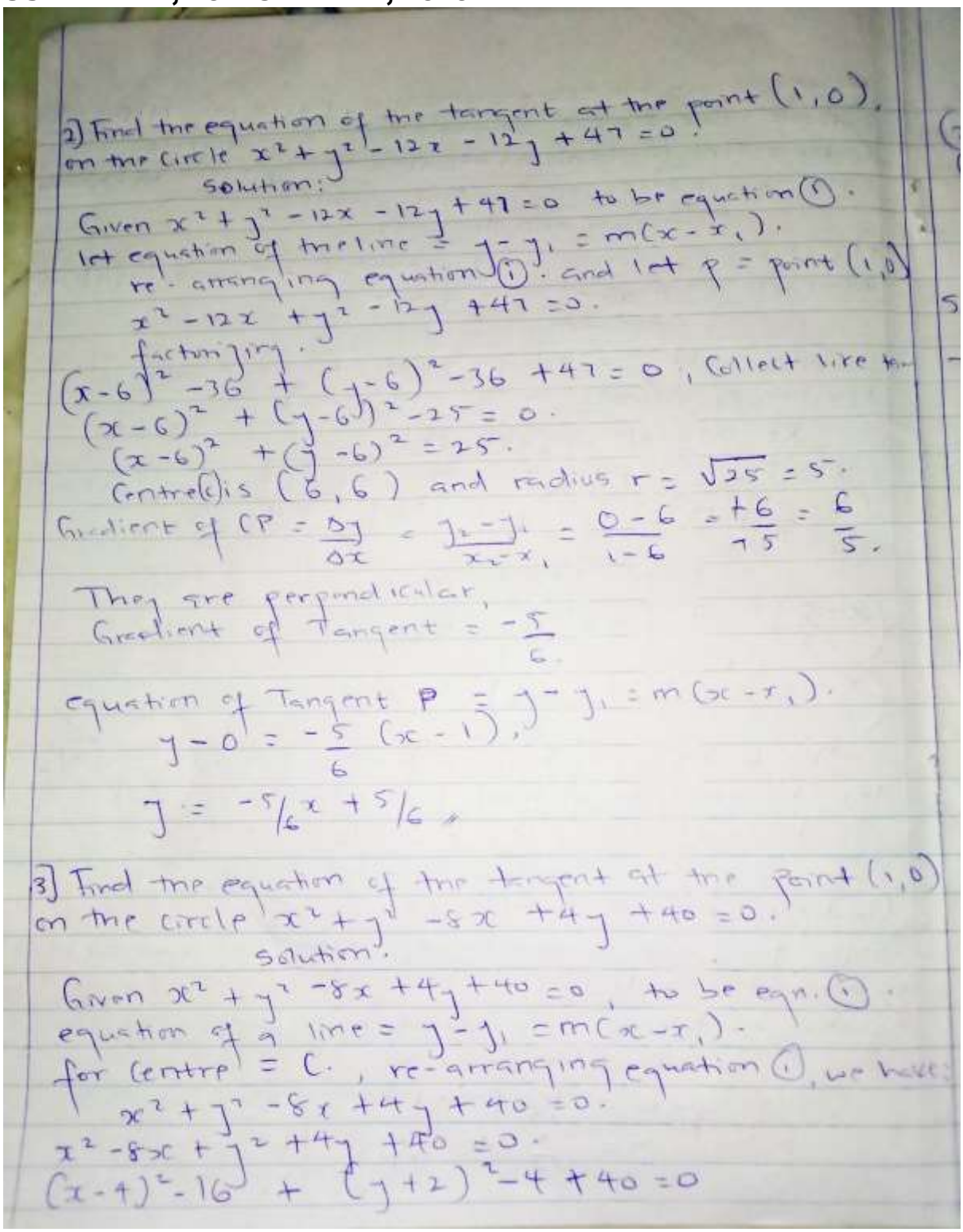

2) Find the equation of the tangent at the point (1,0), on the circle $x^2+y^2-12x-12y+47=0$.

solution:

Given $x^2+y^2-12x-12y+47=0$ to be equation (1).

let equation of the line $= y-y_1 = m(x-x_1)$.

re-arranging equation (1). and let P = point (1,0)

$x^2-12x+y^2-12y+47=0$.

factorizing.

$(x-6)^2-36+(y-6)^2-36+47=0$, Collect like terms

$(x-6)^2+(y-6)^2-25=0$.

$(x-6)^2+(y-6)^2=25$.

Centre(c) is (6,6) and radius $r=\sqrt{25}=5$.

Gradient of $CP = \frac{\Delta y}{\Delta x} = \frac{y_2-y_1}{x_2-x_1} = \frac{0-6}{1-6} = \frac{+6}{+5} = \frac{6}{5}$.

They are perpendicular,

Gradient of Tangent $= -\frac{5}{6}$.

equation of Tangent P $= y-y_1 = m(x-x_1)$.

$y-0 = -\frac{5}{6}(x-1)$,

$y = -5/6x + 5/6$.

3] Find the equation of the tangent at the point (1,0) on the circle $x^2+y^2-8x+4y+40=0$.

solution.

Given $x^2+y^2-8x+4y+40=0$, to be eqn. (1).

equation of a line $= y-y_1 = m(x-x_1)$.

for centre = C., re-arranging equation (1), we have:

$x^2+y^2-8x+4y+40=0$.

$x^2-8x+y^2+4y+40=0$.

$(x-4)^2-16+(y+2)^2-4+40=0$

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