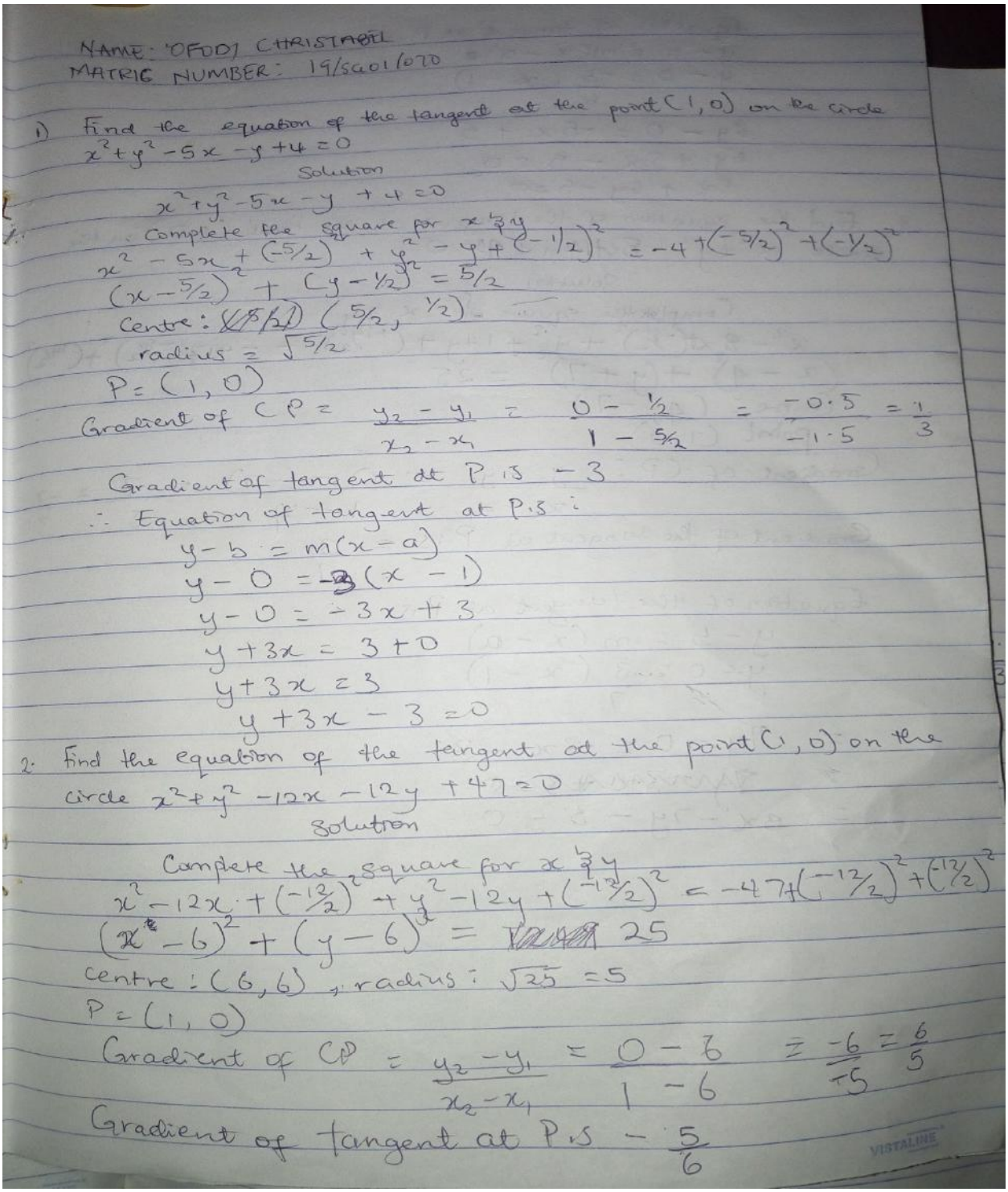
NAME: OFODI CHRISTABEL

MATRIC NUMBER: 19/sci01/070



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

Solution

$x^2+y^2-5x-y+4=0$

Complete the square for x & y

$x^2-5x+(-5/2)^2+y^2-y+(-1/2)^2 = -4+(-5/2)^2+(-1/2)^2$

$(x-5/2)^2+(y-1/2)^2 = 5/2$

Centre: $(5/2, 1/2)$

radius $= \sqrt{5/2}$

$P=(1,0)$

Gradient of $CP = \frac{y_2-y_1}{x_2-x_1} = \frac{0-1/2}{1-5/2} = \frac{-0.5}{-1.5} = \frac{1}{3}$

Gradient of tangent at P is -3

∴ Equation of tangent at P is:

$y-b = m(x-a)$

$y-0 = -3(x-1)$

$y-0 = -3x+3$

$y+3x = 3+0$

$y+3x = 3$

$y+3x-3=0$

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

Solution

Complete the square for x & y

$x^2-12x+(-12/2)^2+y^2-12y+(-12/2)^2 = -47+(-12/2)^2+(-12/2)^2$

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

Centre: $(6,6)$, radius: $\sqrt{25}=5$

$P=(1,0)$

Gradient of $CP = \frac{y_2-y_1}{x_2-x_1} = \frac{0-6}{1-6} = \frac{-6}{-5} = \frac{6}{5}$

Gradient of tangent at P is $-\frac{5}{6}$

Equation of tangent at P is

$y - b = m(x - a)$

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

$6y - 0 = -5x + 5$

$6y + 5x - 5 = 0$

$5x + 6y - 5 = 0$

3. Find the equation of the tangent at the Point (1, 0) on the circle $x^2 + y^2 - 8x + 14y + 40 = 0$

Solution

Complete the square for x & y

$x^2 - 8x + (-8/2)^2 + y^2 + 14y + (14/2)^2 = -40 + (-8/2)^2 + (14/2)^2$

$(x - 4)^2 + (y + 7)^2 = 25$

Centre: $(4, -7)$

Point $(1, 0)$

Gradient of CP: $\frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - (-7)}{1 - 4} = \frac{7}{-3} = -\frac{7}{3}$

Gradient of the tangent at P is $= \frac{3}{7}$

Equation of the tangent at P is

$y - b = m(x - a)$

$y - 0 = \frac{3}{7}(x - 1)$

$7y - 0 = 3x - 3$

$3x - 7y - 3 = 0$