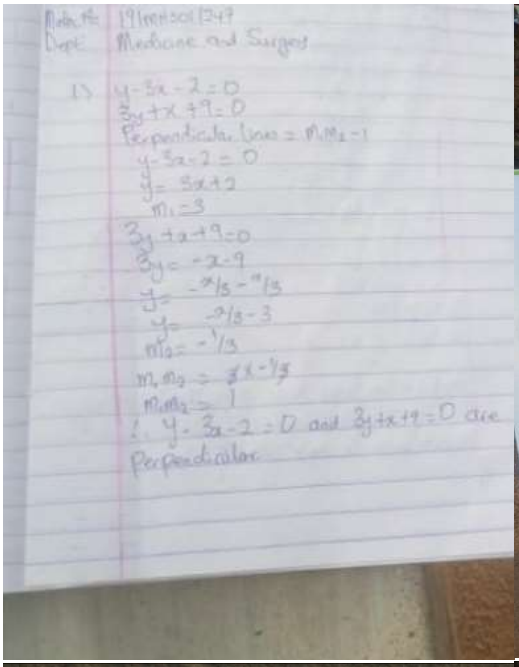
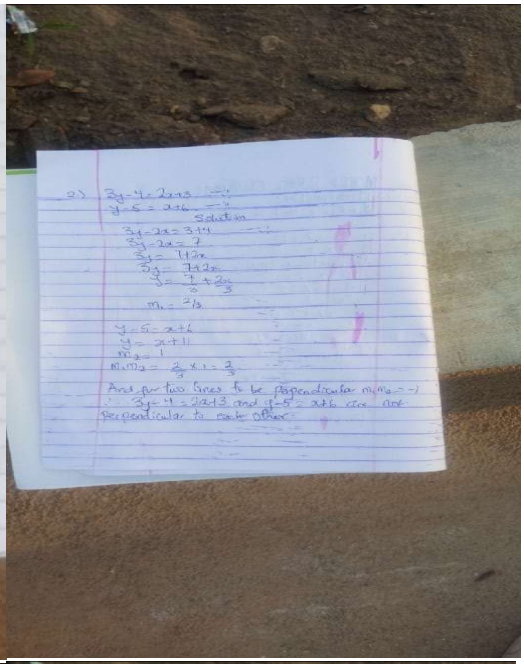
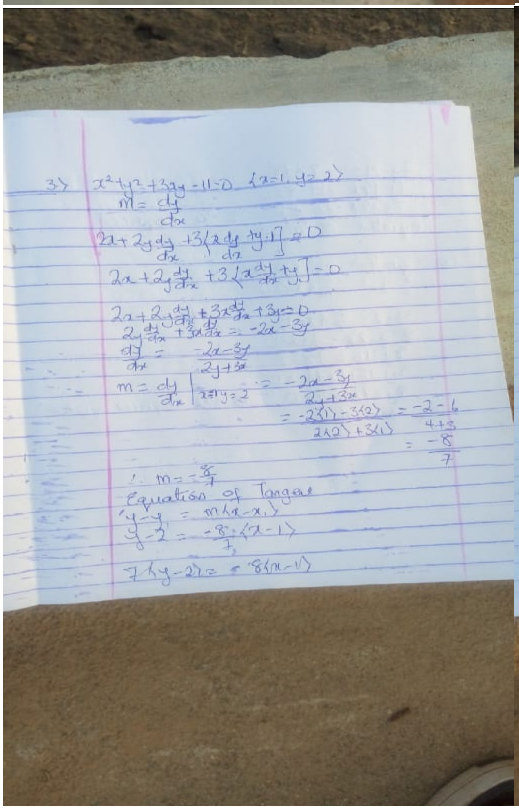
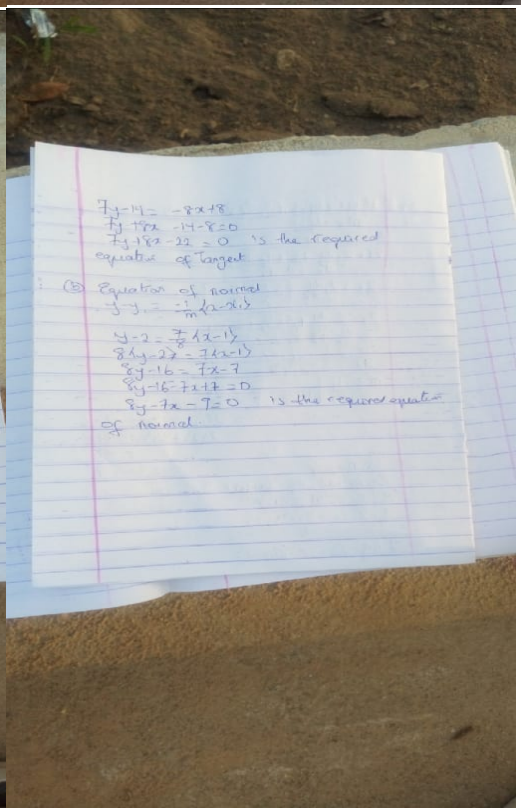
AMOS, OVIE DAVID……19/MHS01/091……MBBS……MAT 104 ASSIGNMENT


Name: 19/mhs01/091
Dept: Medicine and Surgery

1) $y-3x-2=0$
$3y+x+9=0$
Perpendicular lines $= m_1 m_2 = -1$
$y-3x-2=0$
$y=3x+2$
$m_1=3$
$3y+x+9=0$
$3y=-x-9$
$y=-x/3-9/3$
$y=-x/3-3$
$m_2=-1/3$
$m_1 m_2 = 3 \times -1/3$
$m_1 m_2 = -1$
$\therefore y-3x-2=0$ and $3y+x+9=0$ are perpendicular


2) $2y-4=2x+3$
$y-5=x+6$
Solution
$3y-2x=3+4$
$3y-2x=7$
$3y=7+2x$
$y=\frac{7}{3}+\frac{2x}{3}$
$m_1=\frac{2}{3}$
$y=5-x+6$
$y=x+11$
$m_2=1$
$m_1 m_2 = \frac{2}{3} \times 1 = \frac{2}{3}$
And for two lines to be perpendicular $m_1 m_2 = -1$
$\therefore 2y-4=2x+3$ and $y-5=x+6$ are not perpendicular to each other


3) $x^2+y^2+3y-11=0$ $(x=1, y=2)$
$m=\frac{dy}{dx}$
$2x+2y\frac{dy}{dx}+3\left(x\frac{dy}{dx}+y\right)=0$
$2x+2y\frac{dy}{dx}+3\left(x\frac{dy}{dx}+y\right)=0$
$2x+2y\frac{dy}{dx}+3x\frac{dy}{dx}+3y=0$
$2y\frac{dy}{dx}+3x\frac{dy}{dx}=-2x-3y$
$\frac{dy}{dx}=\frac{-2x-3y}{2y+3x}$
$m=\frac{dy}{dx}\Big|_{x=1, y=2} = \frac{-2x-3y}{2y+3x} = \frac{-2(1)-3(2)}{2(2)+3(1)} = \frac{-2-6}{4+3} = \frac{-8}{7}$
$\therefore m=-\frac{8}{7}$
Equation of Tangent
$y-y_1 = m(x-x_1)$
$y-2=-\frac{8}{7}(x-1)$
$7(y-2)=-8(x-1)$


$7y-14=-8x+8$
$7y+8x-14-8=0$
$7y+8x-22=0$ is the required equation of Tangent

(b) Equation of normal
$y-y_1=-\frac{1}{m}(x-x_1)$
$y-2=-\frac{7}{8}(x-1)$
$8(y-2)=7(x-1)$
$8y-16=7x-7$
$8y-16-7x+7=0$
$8y-7x-9=0$ is the required equation of normal