Assignment 2 on Multivariable Calculus

Question 1: Write down the equations of Tangent plane and normal line for the following surfaces and given points. Use 3D GeoGebra and plot the surface, the tangent plane and normal line

a) $x^2+y^2-4z^2-4=0$; $P(2,1,1)$ → Even

b) $3x^2+2y^2-z-11=0$; $P(2,1,3)$ → odd

c) $x^2+y^2+z^2-169=0$; $P(3,4,12)$ → All

d) $x^2-2y^2-3z^2-4=0$; $P(3,1,-1)$ → All

Question 2: Examine the following functions for extrema.

a) $f(x,y)=x^3+y^3-63(x+y)+12xy$ → $T_1 \& 4$

b) $f(x,y)=x^3+y^3-3x-12y+20$ → $T_2 \& 3$

c) $f(x,y)=x^4+y^4-2x^2+4xy-2y^2$ → All

d) $f(x,y)=x^2+xy+y^2-2x-y$ → $T_1 \& 2$

e) $f(x,y)=x^2+y^2-xy+x+y$ → $T_3 \& 4$

f) $f(x,y)=3x-y+6$; S/C: $x^2+y^2=4$ → Even

g) $f(x,y)=x+2y$; S/C: $x^2+y^2=5$ → odd

h) $f(x,y)=x^2+y$; S/C: $x+y=3$ → All