Please show **all** your work! Answers without supporting work will not be given credit.
Clearly mention what theorem(s), if any, you are using.
Write answers in spaces provided.
You have 12 minutes to complete this Quiz.
You can get MAXIMUM $8 + 7 = 15$ marks.

Name:

1. Find the point(s) on the surface $xy + yz + zx + 4 = 0$ where the tangent plane is parallel to the XY-plane.

2. Let $t \geq 0$ denote the time variable. Find the rate of change of the function $f(x, y) = xy$ with respect to time at $t = 1$, on the curve
$$\vec{r}(t) = \langle x(t), y(t) \rangle = \langle \sin(\ln t), \cos(\ln t) \rangle$$

   [BONUS, 2 POINTS] At what time does the function achieve its maximum value?