



<b>Name</b>		<b>ID</b>	
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Question Number	I	II	Total
<b>Mark</b>			

[1] [3.5 Points]

1. **Describe** the domain of  $f(x, y) = \sqrt{1 - x} + e^{x/y}$  and **find** the value of  $f(0,1)$

2. **Sketch** the **level curves** of  $f(x, y) = x - y^2$  for  $k = -2, 0, 1$

3. **Find** the equation of the **level surface** of  $f(x, y, z) = x + yz^2$  that contains the point  $(4,1, -1)$

[II] [3.5 Points]

1. Find the following limits, if they exist

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$$(a) \lim_{(x,y,z) \rightarrow (3,2,1)} \frac{x^2 - 4x + 3}{(x-3)y^2z}$$

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$$(b) \lim_{(x,y) \rightarrow (0,0)} \frac{xy^3}{x^3 + y^6}$$

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2. Discuss the continuity of the following function at  $(0,0,0)$

$$f(x, y, z) = \begin{cases} \frac{xyz}{\sqrt{x^2 + y^2 + z^2}}, & (x, y, z) \neq (0,0,0) \\ 0, & (x, y, z) = (0,0,0) \end{cases}$$

Good Luck 😊