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### Homework Assignment 4 (1)

MTH101 Mathematics I (International Sections)

Due: Friday 4<sup>th</sup> November 2016 before 4.30 pm

1. Find the domain of the function  $f(x, y) = \frac{1}{\sqrt{y - x^2}} + \ln(x - y + 4)$  and sketch the graph of its domain.

2. Convert the equation of a paraboloid  $4x^2 + 4y^2 - z = 0$  (in the rectangular system) into the equations in the cylindrical system and the spherical system.

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3. Draw several level curves of the surface  $z = y^2 - 4x^2$  when  $k = -4$ ,  $k = -1$ ,  $k = 0$ ,  $k = 1$ , and  $k = 4$

4. Draw a graph of quadratic surface  $y^2 + 6x + 4z = x^2 + z^2 + 13$

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5. Provide the name of each of the following surfaces. Also, specify the equation and the type of its trace with the given plane.

Surface's Equation	Name of Surfaces	Equation of the trace of the surface and the given plane	Type of trace
<p>Example:</p> $\frac{x^2}{4} + \frac{y^2}{9} + \frac{z^2}{16} = 1$	<i>Ellipsoid</i>	<p>xz-plane</p> $\frac{x^2}{4} + \frac{z^2}{16} = 1$	<i>Ellipse</i>
<p>5.1)</p> $y^2 - 2x^2 = 3z^2$		The yz-plane	
<p>5.2)</p> $4z^2 - 5y = 6x^2$		The xy-plane	
<p>5.3)</p> $7y^2 + 8z^2 = 9x^2 + 10$		The plane $y = -1$	
<p>5.4)</p> $4z^2 + x^2 - 16y - 8z + 4x + 8 = 0$		The xz-plane	