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MA110 - Engineering Mathematics-1 Problem Sheet - 1

Domains and Ranges of Functions of Several Variables

1. Find the domain and range of the functions:

(a) $\frac{1}{x+y}$	(c) $\cos xyz$	(e) $\frac{1}{x^2+y^2}$
(b) $\frac{x^2 + y^2}{xy}$	(d) $\sqrt{9-x^2-y^2}$	(f) $\frac{1+y^2}{x}$

- 2. Find the domain and its boundary, range, level curves for the function. Also determine whether the domain is closed or open with justification; bounded or unbounded.
 - (a) $f(x,y) = \log(x^2 + y^2)$ (b) $f(x,y) = y/x^2$ (c) $f(x,y) = \sqrt{y-x}$
- 3. Find an equation for the level curves/surfaces passing through the point and contours for the function
 - (a) $f(x,y) = \sqrt{x^2 y}$, (1,0) (b) $f(x,y,z) = \sqrt{x y} \log z$, (3,-1,1)
- 4. Does the function f(x, y, z) = xy z have a minimum value on the line

$$x = t - 1$$
, $y = t - 2$, $z = t + 7$.

If so, what is it?
