

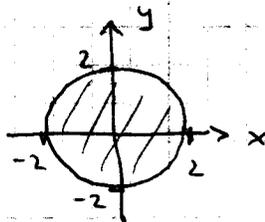
SOLUTIONS: PARAMETRIZING SURFACES (CONTINUED)

SECTION ONE

(1)

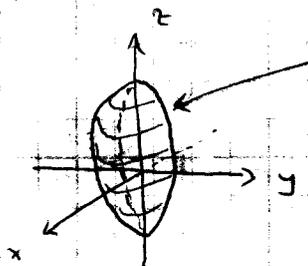


Projecting to the  $xy$ -plane we see the disc  $x^2 + y^2 \leq 4$



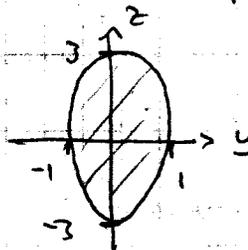
Let the parametrization be  $x = u, y = v, z = 4 - 3u - 2v$  where  $(u, v)$  lies in the disc  $D = \{(u, v) : u^2 + v^2 \leq 4\}$

(2)



half an ellipsoid

Projecting to the  $yz$ -plane we see an ellipse (filled in):



This region (in the  $yz$  plane) is  $y^2 + \frac{z^2}{9} \leq 1$

So take the parametrization to be  $x = 2\sqrt{1 - y^2 - \frac{z^2}{9}}$

$$y = u \\ z = v$$

where  $(u, v)$  lies in the region  $D = \{(u, v) : u^2 + \frac{v^2}{9} \leq 1\}$

(3) Rotating  $x = \sqrt{z}$  about the  $z$ -axis gives  $r = \sqrt{z}$  (in cylindrical polars) i.e.  $z = x^2 + y^2$ .

The parametrization of the paraboloid  $z = x^2 + y^2$  which this suggests is

$$\begin{aligned} x &= \sqrt{z} \cos \theta \\ y &= \sqrt{z} \sin \theta \\ z &= z \end{aligned} \quad \text{for } \begin{cases} 0 \leq \theta < 2\pi \\ 0 \leq z \end{cases}$$

50 SHEETS FILLER 5 SQUARE  
60 SHEETS FILLER 5 SQUARE  
100 SHEETS FILLER 5 SQUARE  
200 SHEETS FILLER 5 SQUARE  
42-388 100 RECYCLED WHITE 5 SQUARE  
42-389 200 RECYCLED WHITE 5 SQUARE  
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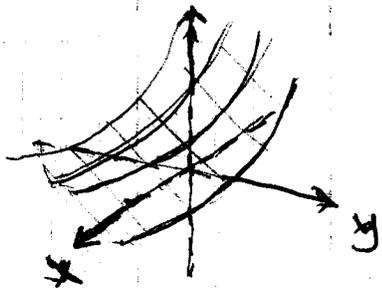
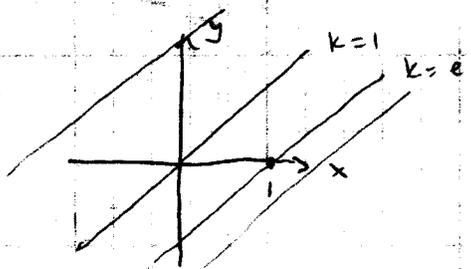


SOLUTIONS: FUNCTIONS OF SEVERAL VARIABLES

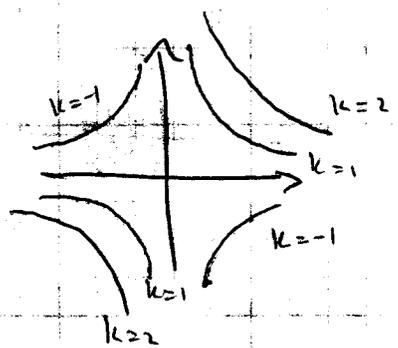
SECTION TWO

1 (a)  $e^{x-y} = k \iff x-y = \ln k \iff y = x - \ln k$

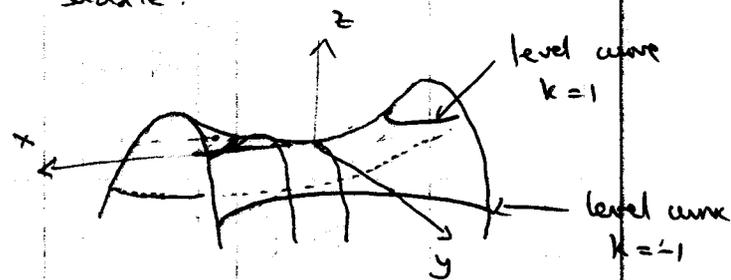
so the level curves are straight lines  $z$



(b)  $xy = k$  is a hyperbola:  $y = k/x$



The graph looks like a saddle:



2 (a) These are planes perpendicular to  $\langle 1, 2, 3 \rangle$

(b) These are spheres with center the origin

13-782  
13-781  
42-381  
42-380  
42-382  
42-383  
500 SHEETS, FILLER, 5 SQUARE  
200 RECYCLED WHITE, 5 SQUARE  
200 RECYCLED WHITE, 5 SQUARE  
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