

Written Homework for 12.1 – 12.3

Neatness and organization is important. Use proper notation throughout and show work where needed. Be sure to label all graphs clearly, including axes, intercepts, and important values (if possible).

1. Look at the map in your text on p 604.

A. Sketch a possible graph of the predicted high temperature  $T$  on a north-south line through Boise.

B. Sketch a possible graph of the predicted high temperature  $T$  on an east-west line through Boise.

2. Find an equation of the largest ellipsoid contained in the box determined by the planes:

$x = 2$ ,  $x =$  the number of letters in your last name,  $y = 5$ ,  $y =$  the number of credits you are currently taking,  $z = -4$ , and  $z = 2$ . Include a sketch of the box.

3. Suppose the concentration,  $C$ , in mg per liter, of a drug in the blood is a function of  $x$ , the amount in mg, of the drug given and  $t$ , the time in hours since the injection. For  $0 \leq x \leq 6$  and  $t \geq 0$ , we have

$$C = f(x, t) = te^{-t(7-x)}.$$

A. Sketch a graph of  $f(6, t)$  and give a practical interpretation in terms of drug concentration.

B. Sketch a graph of  $f(x, 2)$  and give a practical interpretation in terms of drug concentration.

4. By setting one of the variables constant, find a plane that intersects the graph of  $z = (x^2 + 1) \sin y + xy^2$  in each of the following curves. Include the equation of the plane and the equation of the intersection.

A. Parabola

B. Line

C. Sine curve.

5. Problem 24 on p 618.

6. Using the guidelines given in class, sketch a contour diagram for  $f(x, y) = 3x^2 + y^2$ .

7. Using the guidelines given in class, sketch a contour diagram of  $f(x, y) = g(x - y)$  where  $g(t) = -t^2$ .

8. Problem 30 on p628.

9. Find an example of a function of several variables in the media in each of the formats below. (Three different examples.) Credit will be given based on creativity/ originality. No textbook problems or weather/ geographical maps please. Document your example and include a short paragraph explaining the function in everyday terms.

A. Contour map

B. Table

C. Equation