Answers to Even Exercises, Homework Set 3

Section 11.1 #6 All points $(x, y)$ such that $x \geq y^2 - 1$ (so all points on or to the right of the sideways parabola $x = y^2 - 1$. The range of $f$ is $[0, \infty)$.

#10 Contour map I corresponds to the paraboloid, and Contour map II corresponds to the cone.

#32 A, IV

#34 E, III

# 36 D, V

# 42 (a) the graph of $g$ is the graph of $f$ shifted 2 units in positive x direction, (b) the graph of $g$ is the graph of $f$ shifted 2 units in the negative y direction, (c) the graph of $g$ is the graph of $f$ shifted 3 units in the negative x direction and 4 units in the postive y direction.

Section 11.2 # 2 (a) Outdoor temp as a function of longitude, latitude, and time is continuous because small changes any of long, lat, or time can produce only small changes (if any) in temperature - the temp will not jump abruptly from one value to another, (b) elevation can jump abruptly from one value from another (think of a vertical cliff) - so a very small change in long or lat can produce a comparatively large change in elevation - so elevation is not necessarily continuous. (c) the cost of a taxi ride is usually discontinuous, because the cost increases in jumps, at each minute, rather than changing continously over time.

# 4 (table of values near (0,0) omitted - please complete on your own) This limit does not exist.

# 34 $\lim_{(x,y)\to(0,0)}(x^2 + y^2)\ln(x^2 + y^2) = 0$