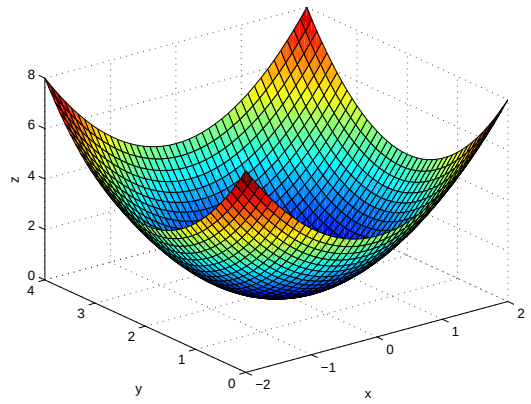
Answers to Even Exercises, Review problems from Ch 11

Chapter 11 #4 This is a circular paraboloid with vertex $(0, 2, 0)$, and axis parallel (but not equal to) the z-axis.



#10 Approaching the origin along the line $y = 0$ we get that

$$\lim_{(x,y)\to(0,0)} \frac{2xy}{x^2 + 2y^2} = \lim_{x\to 0} \frac{0}{2x^2} = \lim_{x\to 0} 0 = 0$$

And approaching along the line $y = x$ we get:

$$\lim_{(x,y)\to(0,0)} \frac{2xy}{x^2 + 2y^2} = \lim_{x\to 0} \frac{2x^2}{4x^2} = \lim_{x\to 0} 1/2 = 1/2$$

Since we get two different values for the limit by approaching $(0, 0)$ from two different directions, the limit as $(x, y) \to (0, 0)$ of $\frac{2xy}{x^2+2y^2}$ does not exist!

#12 Linear approximation: $T(x, y) \approx 3.5(x - 6) - 3(y - 4) + 80$,so we can approximate $T(5, 3.8) \approx 3.5(-1) - 3(-.2) + 80 = 80 - 2.9 = 77.1$

#34 max $1.7cm^2$ error in the area of the triangle, and the max error in the length of the hypotenuse is 3.4/13 cm.

40 Area of the triangle is $(1/2)xy\sin(\theta)$. Using the given info we have the rate of change of the area is $17.5 + 25\sqrt{3} in^2/s$.

56 The absolute maximum value of f on D is $f(0, \pm 1) = 2e^{-1}$, and the absolute minimum value of f on D is $f(0, 0) = 0$

64 The dimensions of a package with largest volume possible that has girth $= 108$ are $36 \times 18 \times 18$.