# Solutions for Homework 25

8 points

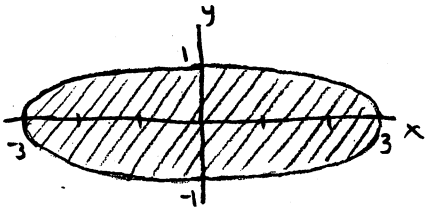
Solutions by: Tanner Fahl

Section 11.1 #5, 9, 10, 12, 15, 25, 33, 34

**(5)** $f(x,y) = \ln(9 - x^2 - 9y^2)$

1 pt

$9 - x^2 - 9y^2 > 0 \Rightarrow \boxed{x^2 + 9y^2 < 9}$ ← this is the equation of an ellipse




**(9)** from the contour map: $f(-3,3) \approx 55$

.5 pts

$f(3,-2) \approx 35$

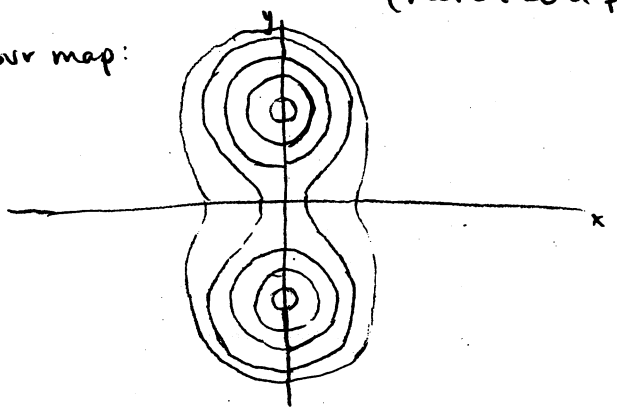
**(10)** map I: paraboloid
map II: cone

.5 pts

} The level curves from map II are evenly spaced meaning that the height of the graph increases at a constant rate (like a cone), whereas in map II, the level curves have uneven spacing meaning that height increases at a changing rate (more like a paraboloid).

**(12)** contour map:

1 pt.




**(15)** $f(x,y) = xy$

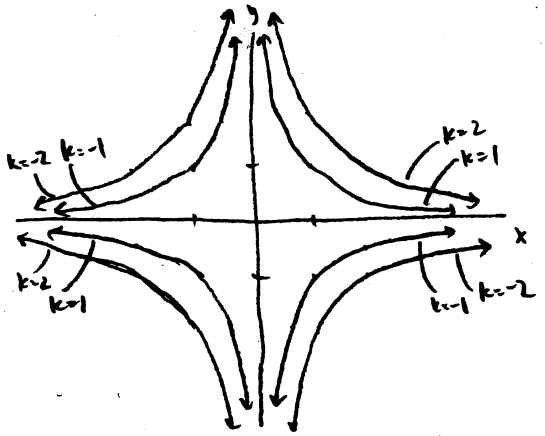
1.5 pts

$k=1: \quad xy = 1 \Rightarrow y = \frac{1}{x}$

$k=2: \quad xy = 2 \Rightarrow y = \frac{2}{x}$

$k=-1: \quad xy = -1 \Rightarrow y = -\frac{1}{x}$

$k=-2: \quad xy = -2 \Rightarrow y = -\frac{2}{x}$




**(25)** $T(x,y) = \frac{100}{(1 + x^2 + 2y^2)}$

1.5 pts

$k=50: \quad 50 = \frac{100}{1 + x^2 + 2y^2} \Rightarrow x^2 + 2y^2 = 1$

$k=20: \quad 20 = \frac{100}{1 + x^2 + 2y^2} \Rightarrow x^2 + 2y^2 = 4$

$k=10: \quad 10 = \frac{100}{1 + x^2 + 2y^2} \Rightarrow x^2 + 2y^2 = 9$