11–20 Find and sketch the domain of the function.

13. $f(x, y) = \ln(9 - x^2 - 9y^2)$

15. $f(x, y) = \sqrt{1 - x^2} - \sqrt{1 - y^2}$

17. $f(x, y) = \dfrac{\sqrt{y - x^2}}{1 - x^2}$
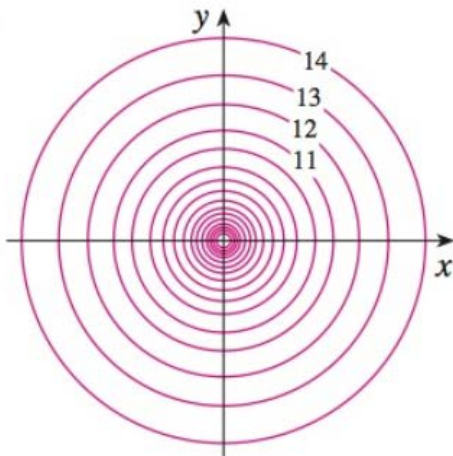
18. $f(x, y) = \arcsin(x^2 + y^2 - 2)$

19. $f(x, y, z) = \sqrt{1 - x^2 - y^2 - z^2}$

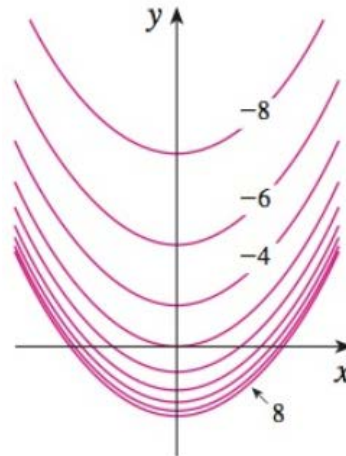**21–29** Sketch the graph of the function.

23. $f(x, y) = 10 - 4x - 5y$ **24.** $f(x, y) = \cos x$

35–38 A contour map of a function is shown. Use it to make a rough sketch of the graph of f.   #35 NA

35.

36.

39–46 Draw a contour map of the function showing several level curves.   #s 40, 42, 44 NA

41. $f(x, y) = y - \ln x$ **40.** $f(x, y) = x^3 - y$

43. $f(x, y) = ye^x$ **42.** $f(x, y) = e^{y/x}$

45. $f(x, y) = \sqrt{y^2 - x^2}$ **44.** $f(x, y) = y \sec x$

51–54 Use a computer to graph the function using various domains and viewpoints. Get a printout of one that, in your opinion, gives a good view. If your software also produces level curves, then plot some contour lines of the same function and compare with the graph.   #s 51-2 NA

51. $f(x, y) = e^{-x^2} + e^{-2y^2}$ **52.** $f(x, y) = (1 - 3x^2 + y^2)e^{1-x^2-y^2}$

53. $f(x, y) = xy^2 - x^3$ (monkey saddle)

54. $f(x, y) = xy^3 - yx^3$ (dog saddle)

55–60 Match the function (a) with its graph (labeled A–F on page 905) and (b) with its contour map (labeled I–VI). Give reasons for your choices.   Spend *some* - not a *lot* - of time looking for patterns. I don't need to see you sketch/copy these for the matching.

55. $z = \sin(xy)$ **56.** $z = e^x \cos y$

57. $z = \sin(x - y)$ **58.** $z = \sin x - \sin y$

59. $z = (1 - x^2)(1 - y^2)$ **60.** $z = \dfrac{x - y}{1 + x^2 + y^2}$

See 14-1-figures-for-exercises document in this directory.