Wind Chill \(= 35.74 + 0.6215T - 35.75V^{0.16} + 0.4275TV^{0.16}\)

http://www.weather.gov/os/windchill/index.shtml
Computer-generated graphs of functions

(c) \( f(x, y) = \sin x + \sin y \)

(d) \( f(x, y) = \frac{\sin x \sin y}{xy} \)

Maple Commands

> with(plots):

> plot3d(sqrt(x^2+y), x=-1..1, y=-1..1);

Find and sketch the domain of the function \( f(x, y) = \sqrt{1 + x - y^2} \).
Level curves being lifted up to graphs of functions

Topographic map
Level curves are curves of constant elevation above sea level

The point A is at a place on the mountain where the level curves are tightly packed.
This indicates rapid change in elevation, the mountain is steep here.

The point B is at a place on the mountain where the level curves are far apart.
This indicates that the mountain relatively flat here.
Average January sea-level temperatures measured in degrees Celsius

The level curves are called **isothermals**, they join areas with the same temperature.

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Atmospheric pressure measured in millibars

The level curves are called **isobars**

**Surface winds**
- are strongest where the isobars are tightly packed
- tend to flow from areas of high pressure across the isobars to areas of low pressure
The graph of \( h(x, y) = 4x^2 + y^2 \) is formed by lifting the level curves.

![Contour map](image1)

(a) Contour map

(b) Horizontal traces are raised level curves

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Level curves and two views of \( f(x, y) = -xye^{-x^2-y^2} \)

![Level curves and two views](image2)
14.1 Multivariable Functions

\[ f(x, y) = \frac{-3y}{x^2 + y^2 + 1} \]

(a) \( f(x, y) = |x| + |y| \)

(b) \( f(x, y) = |xy| \)

(c) \( f(x, y) = \frac{1}{1 + x^2 + y^2} \)

(d) \( f(x, y) = (x^2 - y^2)^2 \)

(e) \( f(x, y) = (x - y)^2 \)

(f) \( f(x, y) = \sin(|x| + |y|) \)
53. \( z = \sin \sqrt{x^2 + y^2} \)

54. \( z = x^2y^2e^{-x^2-y^2} \)

55. \( z = \frac{1}{x^2 + 4y^2} \)

56. \( z = x^3 - 3xy^2 \)

57. \( z = \sin x \sin y \)

58. \( z = \sin^2 x + \frac{1}{4} y^2 \)