Example 1: Windchill temperature is a temperature which tells you how cold it feels as a result of the combination of wind and temperature. Let $C = f(w, T)$, where C is the windchill temperature (in degrees Fahrenheit) that is associated with a wind speed of w miles per hour and a temperature of T degrees Fahrenheit. A table of values for the function f is given to the right:

| $w \setminus T$	35	30	25	20	15	10	5	0
5	31	25	19	13	7	1	-5	-11
10	27	21	15	9	3	-4	-10	-16
15	25	19	13	6	0	-7	-13	-19
20	24	17	11	4	-2	-9	-15	-22
25	23	16	9	3	-4	-11	-17	-24

(a) Evaluate and interpret $f(20, 5)$.

$f(20, 5) = -15$ which means that when the wind is blowing at 20 mph and the temperature is 5° F it feels like -15° F.

(b) How fast does the wind need to blow for it to feel like $-10°$F when the air temperature is really $5°$F?

We look at the column corresponding to $T = 5$. The wind chill is $-10°$F when $w = 10$ mph.

Example 2: Find an equation of the sphere centered at $(1, 2, -1)$ with radius 3. With z-axis being vertical, find the highest and the lowest point on the sphere.
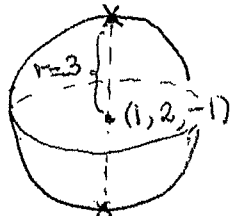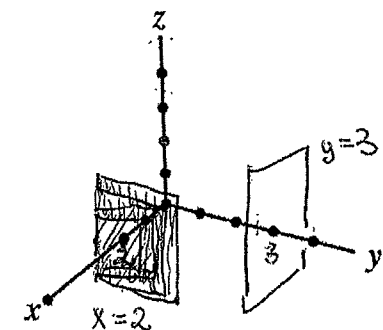

The equation is $(x-1)^2 + (y-2)^2 + (z+1)^2 = 9$.

The highest point is the point 3 units above the center; that is, $(1, 2, 2)$.

The lowest point is the point 3 units below the center; that is $(1, 2, -4)$.

Example 3: Sketch and describe in words the plane $y = 3$ and the plane $x = 2$.

$y = 3$ is a vertical plane, parallel to the xz-plane, passing through $(0, 3, 0)$.

$x = 2$ is a vertical plane, parallel to the yz-plane, through $(2, 0, 0)$.

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