Plot3D

`Plot3D[f, {x, xmin, xmax}, {y, ymin, ymax}]` generates a three-dimensional plot of `f` as a function of `x` and `y`.

`Plot3D[{f, s}, {x, xmin, xmax}, {y, ymin, ymax}]` generates a three-dimensional plot in which the height of the surface is specified by `f`, and the shading is specified by `s`.

`Plot3D` evaluates its arguments in a non-standard way (see page ??). The following options can be given:

- **AmbientLight** /GrayLevel[0.]/ ambient illumination level
- **AspectRatio** 1 ratio of height to width
- **BoxRatio** s /{1, 1, 0.4}/ bounding 3D box ratios
- **Boxed** True whether to draw the bounding box
- **ClipFill** Automatic how to draw clipped parts of the surface
- **DisplayFunction** $DisplayFunction function for generating output
- **Framed** False whether to draw a frame
- **LightSources** (see below) positions and colors of light sources
- **Lighting** False whether to use simulated illumination
- **Mesh** True whether to draw a mesh on the surface
- **PlotMatrix** Automatic perspective transformation matrix
- **PlotColor** True whether to plot in color
- **PlotLabel** None a label for the plot
- **PlotPoints** 15 the number of sample points in each direction
- **PlotRange** Automatic range of values to include
- **Shading** True whether to shade polygons
- **ViewPoint** `{1.3, -2.4, 2.}` viewing position

`Plot3D` returns a `SurfaceGraphics` object. The function `f` should give a real number for all values of `x` and `y` at which it is evaluated. There will be holes in the final surface at any values of `x` and `y` for which `f` does not yield a real number value. If `Lighting`->`False` and no shading function `s` is specified, the surface is shaded with gray levels according to height. The shading function `s` must yield values of the form `GrayLevel[i]` or `RGBColor[r, g, b]`. The default light sources used are as for `Graphics3D`. See page 120. See also: `ListPlot3D`, `ContourPlot`, `DensityPlot`, `Graphics3D`.