Hack the code, below to implement the problem assigned.
To execute a Maple command, you just hit enter on the command line.
This file is entitled **14-4-handout-for-maple.**

```
Error, missing operator or `;`
```

1. Right-click and download as "All Files" (The default is "xml" which is worthless.)
2. Remove the **.xml** file suffix and replace it with **.mw** before you save it.
3. Modify the code to represent the same work for the function and the point of interest assigned to you.
4. Tweak the limits of the **plot3d**, **SpaceCurve** commands, for better presentation of the image.
5. Experiment with right-click on the images created. There are many options. I like the Zoom and Pan options, in particular.
6. Finally, save this file using your last name.

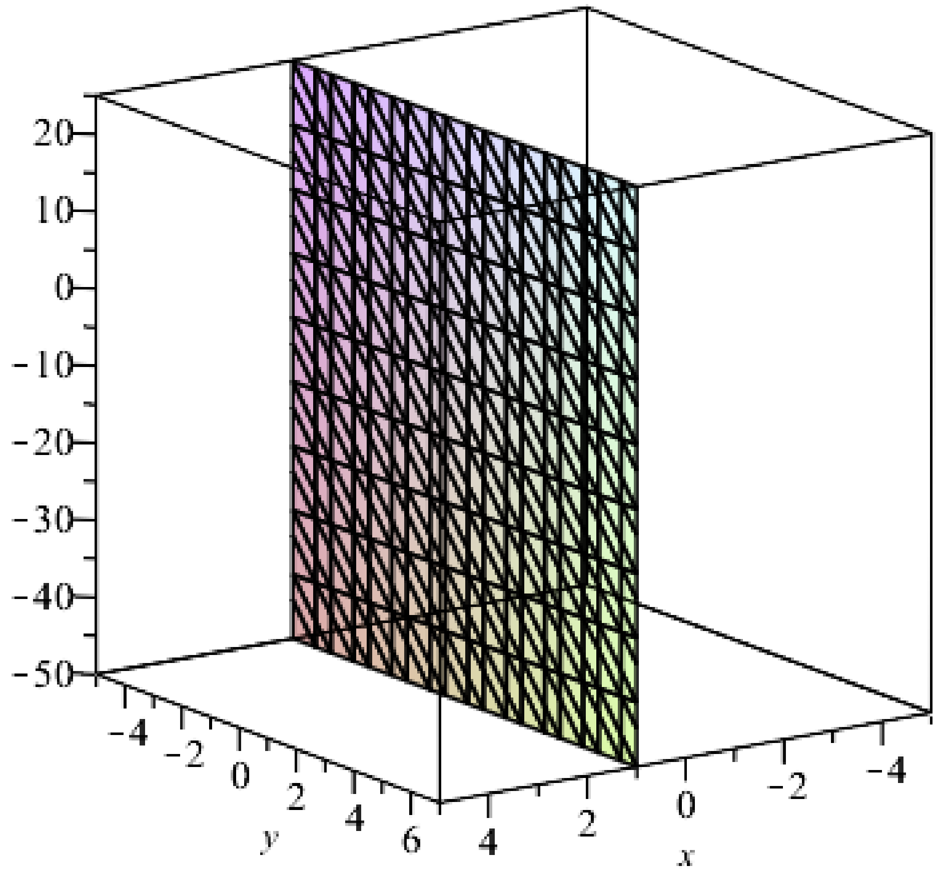
An implementation of a Section 14.3 problem that's a lead-in into 14.4.

Load the packages we'll need:

$with(plots):$
$with(VectorCalculus):$

The following is the plane $x = 1$, parallel to the *yz*-plane. I'll want you to do a 2nd plane, as well, parallel to the *xz*-plane.

$plotplane1 := implicitplot3d(x = 1, x = -5..5, y = -5..7, z = -50..25, axes = boxed, style = surfacewireframe, labels = [x - axis, y - axis, z - axis], transparency = .5) : \%:$



You'll need to edit the following for your particular function:

$g := (x, y) \rightarrow 6 - x - x^2 - 2 \cdot y^2$

$$g := (x, y) \mapsto 6 + (-x) + (-x^2) + (-2\, y^2) \quad \textbf{(1.1)}$$

$g(x, y)$

$$-x^2 - 2\, y^2 - x + 6 \quad \textbf{(1.2)}$$

$g(1, 2)$

$$-4 \quad \textbf{(1.3)}$$

plotfunc := *plot3d*(*g*, -5 ..5, -5 ..5, *axes* = *normal*, *style* = *surfacewireframe*, *color* = *green*, *transparency* = .5) : %:

$gx := D[1](g)$

$$gx := (x, y) \mapsto -2\, x - 1 \quad \textbf{(1.4)}$$

$gy := D[2](g)$

$$gy := (x, y) \mapsto -4\, y \quad \textbf{(1.5)}$$

The following is the trace in the plane $x = 1$. You'll want to edit this, and you will also need a *gtrace2* defined similarly, but at right angles to this for a plane parallel to the *xz*-plane.

$gtrace1 := g(1, y)$

$$gtrace1 := -2\,y^2 + 4 \tag{1.6}$$

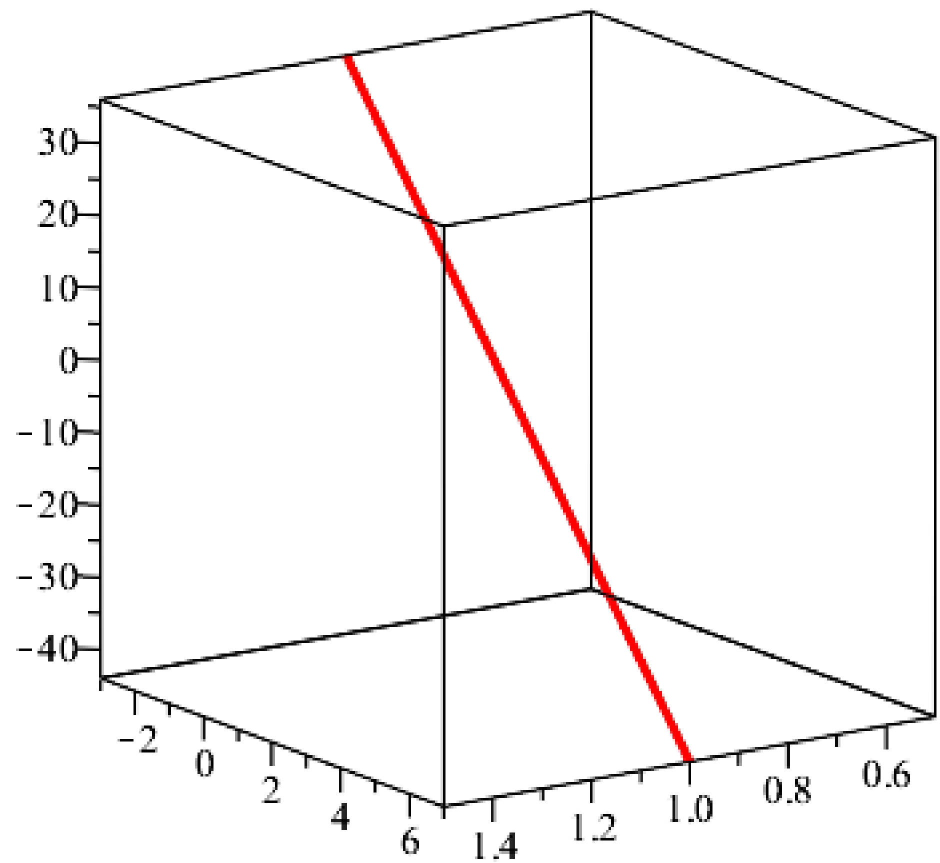
As expected, the following is only half of it. You'll need the other half, too.

gtraceprime1 : *diff* (*gtrace1*, *y*)

$$-4\,y \tag{1.7}$$

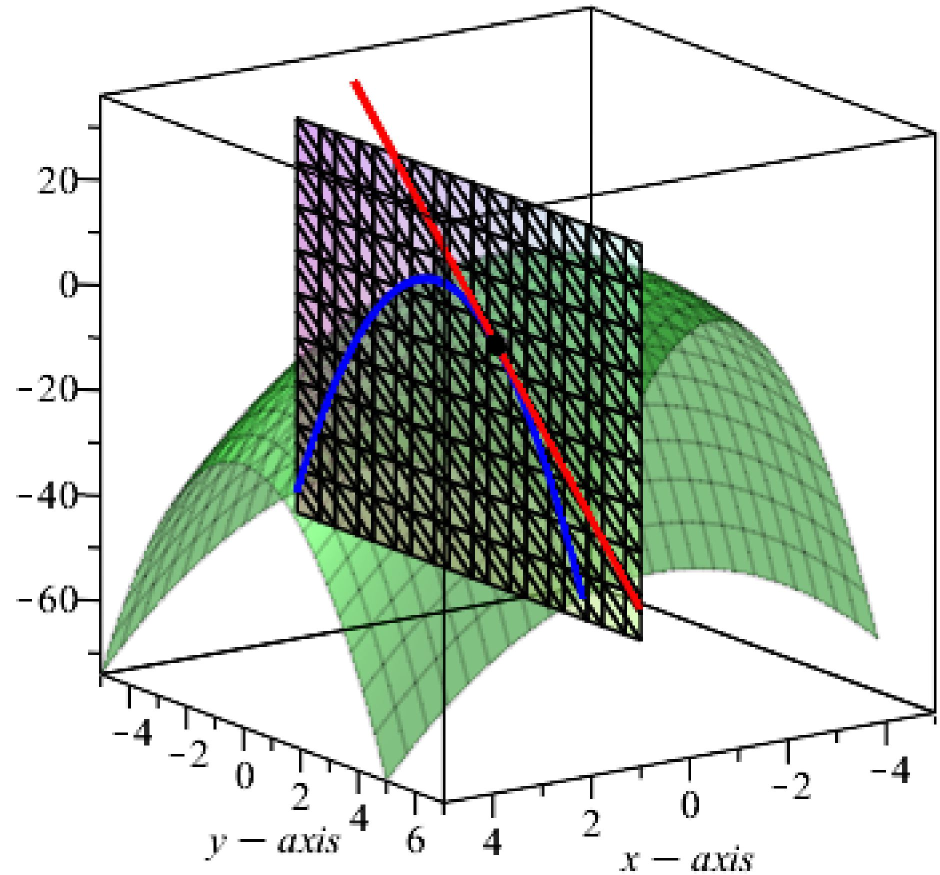
I'll want the other tangent line plotted, as well as the one, below:

plottanline1 := *SpaceCurve*(⟨1, t + 2, -4 − 8·t⟩ , *t* = -5 ..5, *color* = *red*, *thickness* = 3) : %:

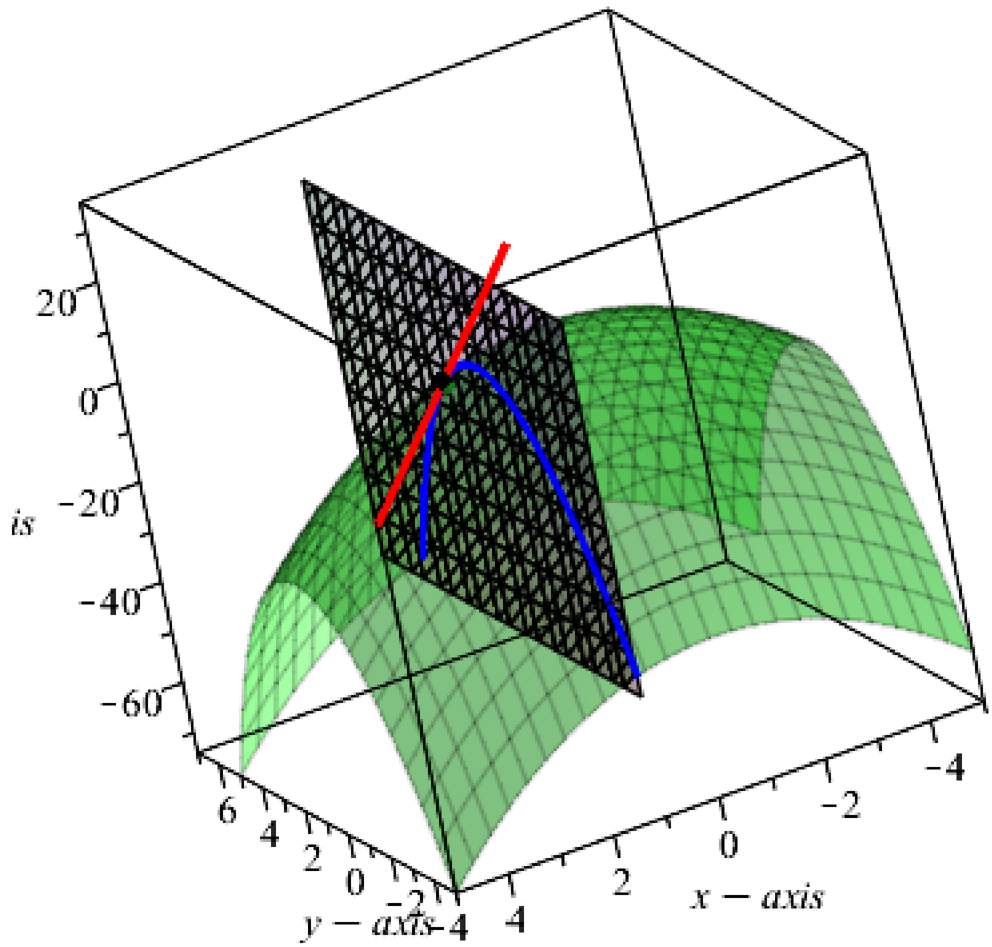


You'll need a plottrace2, for the plane running parallel to the *x*-axis.

plottrace1 := *SpaceCurve*(⟨1, *t*, 4 − 2·*t*²⟩ , *t* = -5 ..5, *color* = *blue*, *thickness* = 3) : %:
plotthepoint := *pointplot3d*({ [1, 2, -4] }, *symbol* = *solidcircle*, *symbolsize* = 20, *color* = *black*) : %:
display([*plotfunc*, *plotplane1*, *plottrace1*, *plottanline1*, *plotthepoint*], *axes* = *boxed*, *labels* = [*x* − *axis*, *y* − *axis*, *z* − *axis*])



20
0
−20
−40
−60
−4
−2
0
2
4
6
y − axis
4
2
0
−2
−4
x − axis



15.4 has us constructing tangent planes to a point on a surface

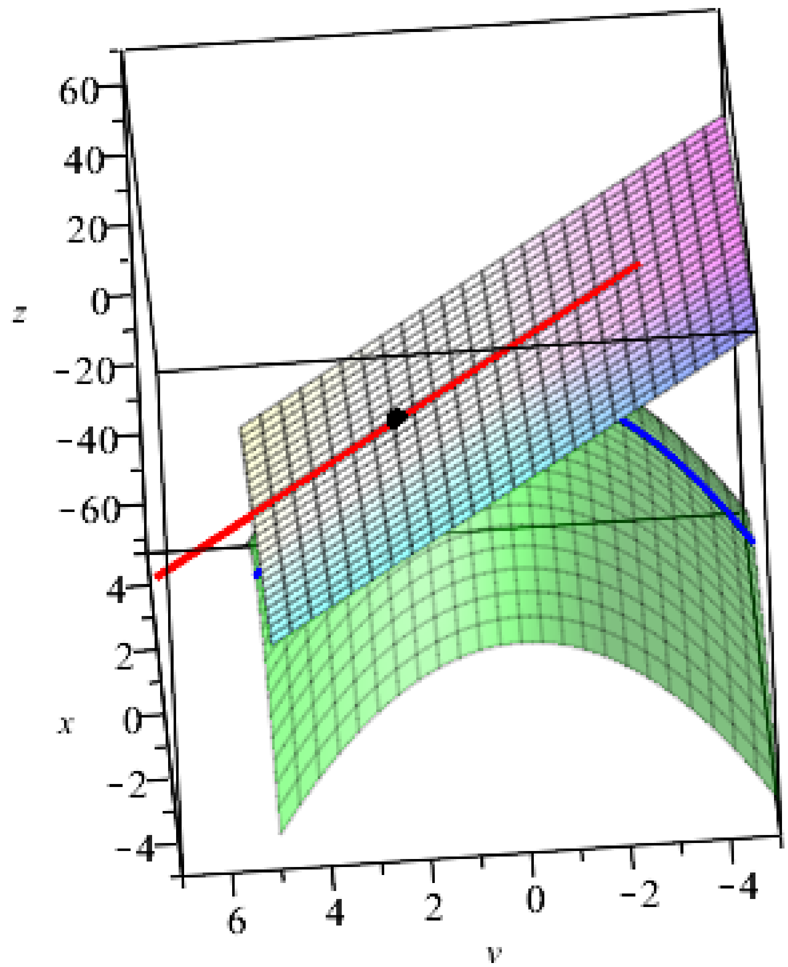
$tanplane := (x, y) \rightarrow gx(1, 2) \cdot (x-1) + gy(1, 2) \cdot (y-2) - 4$

$$tanplane := (x, y) \mapsto gx(1, 2)\ (x-1) + (gy(1, 2)\ (y-2)) - 4 \tag{2.1}$$

$tanplaneplot := plot3d(tanplane, -5..5, -5..5, axes = normal, style = surfacewireframe) : \% :$

The **display** command allows you to put named plots into one plot:

$display([plotfunc, tanplaneplot, plottrace1, plottanline1, plotthepoint], axes = boxed, labels = [x, y, z])$



z
60
40
20
0
-20
-40
-60
x
4
2
0
-2
-4
y
6
4
2
0
-2
-4