Hack the code, below to implement the problem assigned online.

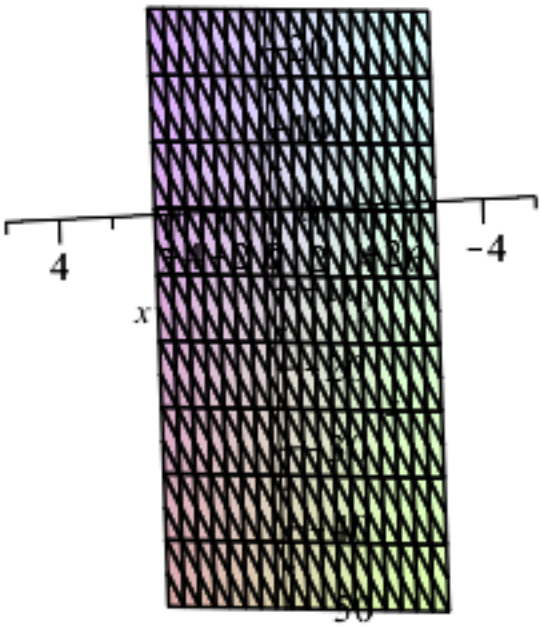
$$f(x, y) := 4 \cdot \arctan(x \cdot y)$$

$$f := (x, y) \to 4 \arctan(y\, x) \quad \textbf{(1)}$$

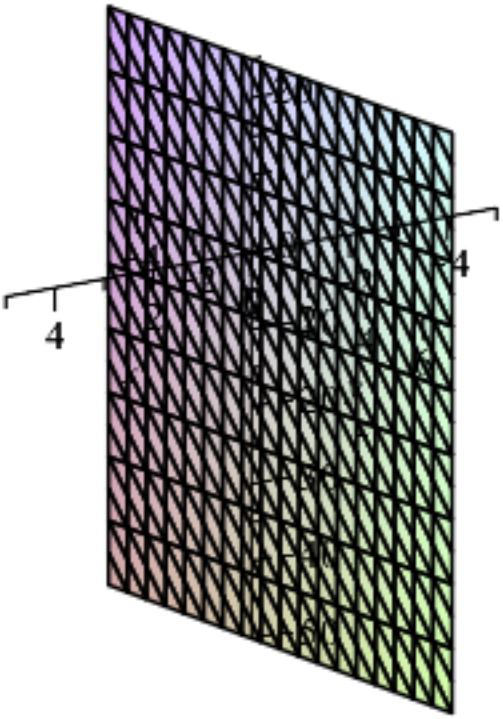
$$at\ (1, 1)$$

$$at\ (1, 1) \quad \textbf{(2)}$$

```
with(plots):
with(VectorCalculus):
plotplane := implicitplot3d(x = 1, x = -5..5, y = -5..7, z = -50..25, axes = normal, style
    = surfacewireframe, transparency = .5, labels = [x - axis, y - axis, z - axis]): %:
```




```
implicitplot3d(x = 0, x = -5..5, y = -5..7, z = -50..25, axes = normal, style = surfacewireframe,
    transparency = .5, labels = [x - axis, y - axis, z - axis])
```



$g := (x, y) \to 4 \cdot \arctan(x \cdot y)$

$$g := (x, y) \mapsto 4 \arctan(x\,y) \quad \textbf{(3)}$$

$g(x, y)$

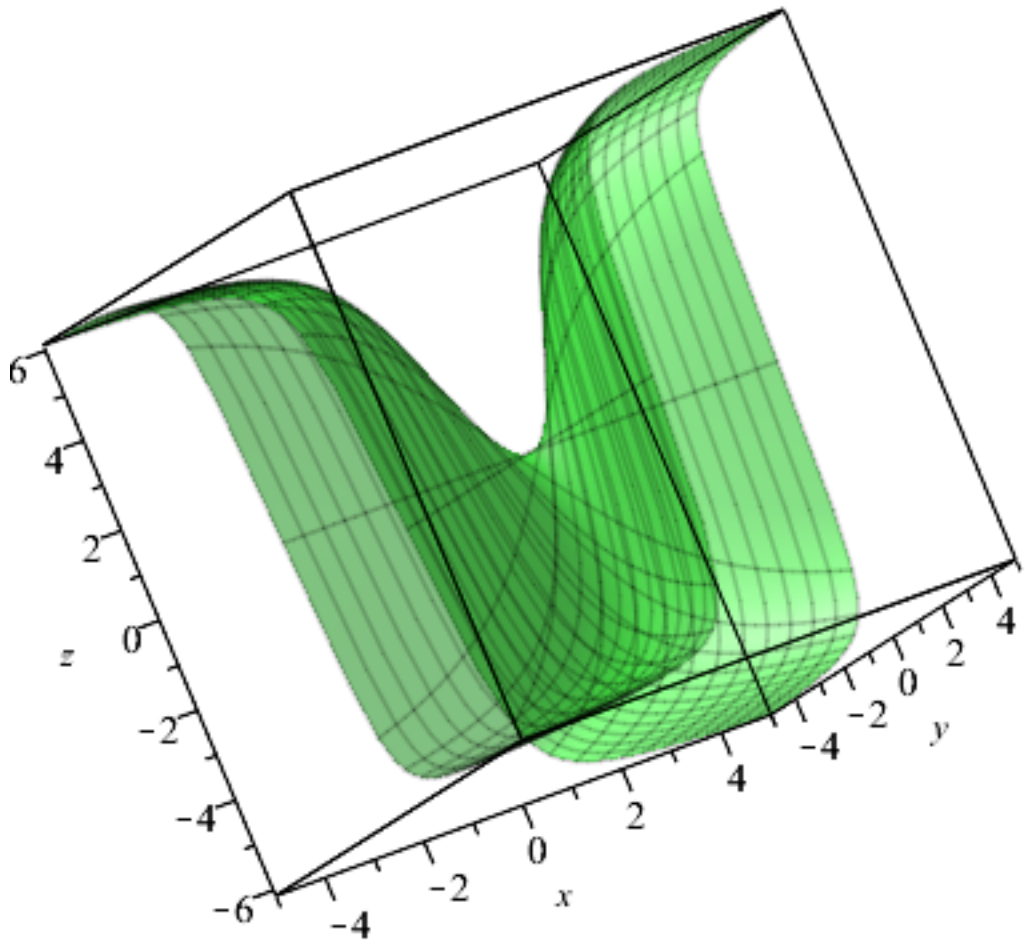
$$4 \arctan(x\,y) \quad \textbf{(4)}$$

$g(1, 1)$

$$\pi \quad \textbf{(5)}$$

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

$plot3d(g, -5..5, -5..5, axes = boxed, style = surfacewireframe, color = green, labels = [x, y, z], transparency = .5)$



$gx := \mathrm{D}[1](g)$

$$gx := (x, y) \mapsto \frac{4\,y}{x^2\,y^2 + 1} \tag{6}$$

$gy := \mathrm{D}[2](g)$

$$gy := (x, y) \mapsto \frac{4\,x}{x^2\,y^2 + 1} \tag{7}$$

$tanline :=$

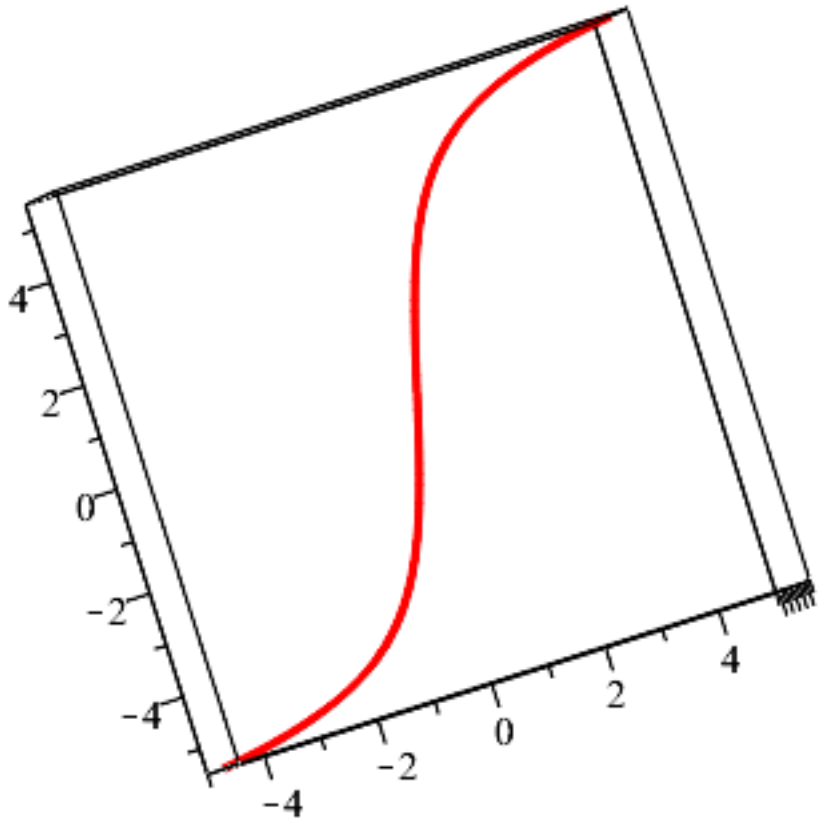
$gtrace := y \to g(1, y)$

$$gtrace := y \mapsto g(1, y) \tag{8}$$

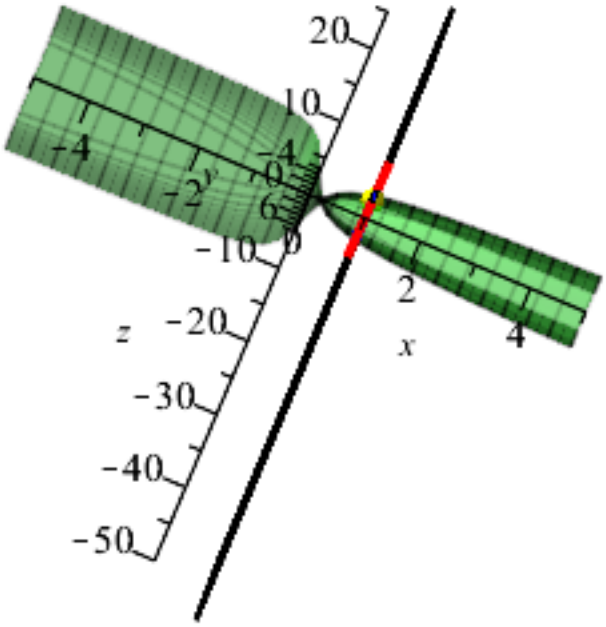
$gtraceprime : diff(gtrace, y)$

$$\frac{4}{y^2 + 1} \tag{9}$$

$plottanline := SpaceCurve(\langle 1, t, \mathrm{Pi} + 2 \cdot (t - 1) \rangle, t = -5..5, color = red, thickness = 3) : \%:$
$SpaceCurve(\langle 1, t, gtrace(t) \rangle, t = -5..5, color = red, thickness = 3)$



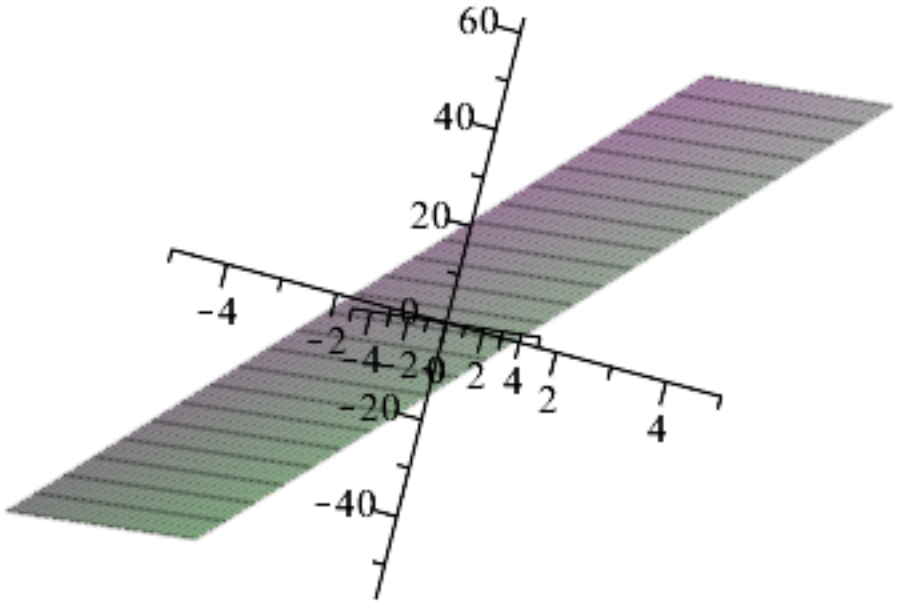

```
plottrace := SpaceCurve( ⟨1, t, gtrace(t)⟩ , t =-5 ..5, color = blue, thickness = 3 ) : % :
plotthepoint := pointplot3d( { [1, 1, Pi ]}, symbol = solidcircle, symbolsize = 20, color = yellow) : % :
display( [ plotfunc, plotplane, plottrace, plottanline, plotthepoint])
```



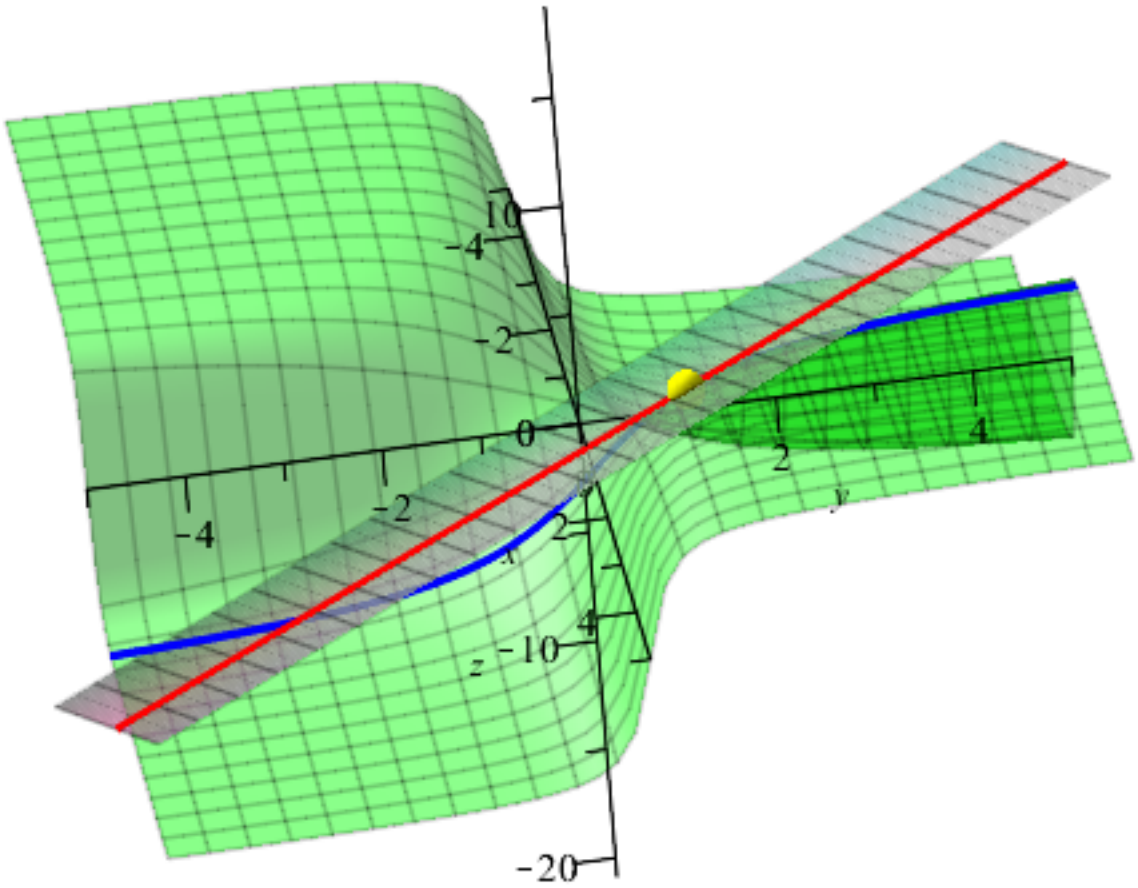
$$tanplane := (x, y) \rightarrow gx(1, 1) \cdot (x - 1) + gy(1, 1) \cdot (y - 1) + \mathrm{Pi}$$

$$tanplane := (x, y) \mapsto gx(1, 1)\ (x - 1) + (gy(1, 1)\ (y - 1)) + \pi \qquad \textbf{(10)}$$

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



display([*plotfunc*, *tanplaneplot*, *plottrace*, *plottanline*, *plotthepoint*], *labels* = [*x*, *y*, *z*])



?*plotoptions*