

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

$$f(x, y) = \sqrt{x \cdot y}$$

$$f(x, y) = \sqrt{xy}$$

(1)

at (1, 4)

4 at

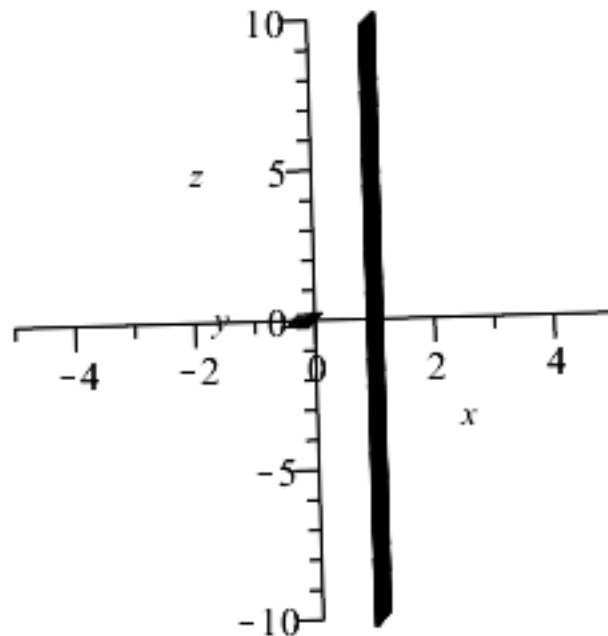
(2)

with(plots) :

with(VectorCalculus) :

```
plotplane := implicitplot3d(x = 1, x = -5 .. 5, y = -5 .. 5, z = -10 .. 10, axes = normal, style  
= surfacewireframe, transparency = .5, labels = [x - axis, y - axis, z - axis]) : %:
```

```
implicitplot3d(x = 1, x = -5 .. 5, y = -5 .. 5, z = -10 .. 10, axes = normal, style = surfacewireframe,  
transparency = .5, labels = [x - axis, y - axis, z - axis])
```



$$g := (x, y) \rightarrow \sqrt{x \cdot y}$$

$$g := (x, y) \mapsto \sqrt{xy}$$

(3)

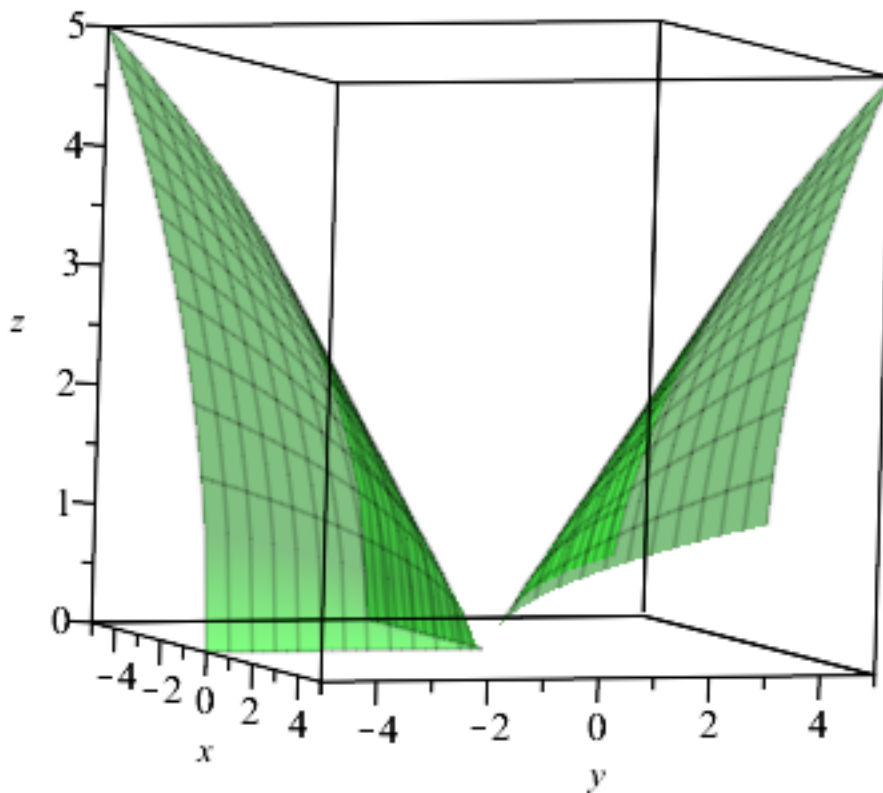
$g(x, y)$

$$g(1, 4) \quad \sqrt{xy} \quad (4)$$

$$2 \quad (5)$$

`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)`



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

$$gy := (x, y) \mapsto \frac{x}{2\sqrt{yx}} \quad (6)$$

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

$$gx := (x, y) \mapsto \frac{y}{2\sqrt{yx}} \quad (7)$$

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

$$gtrace := \sqrt{y} \quad (8)$$

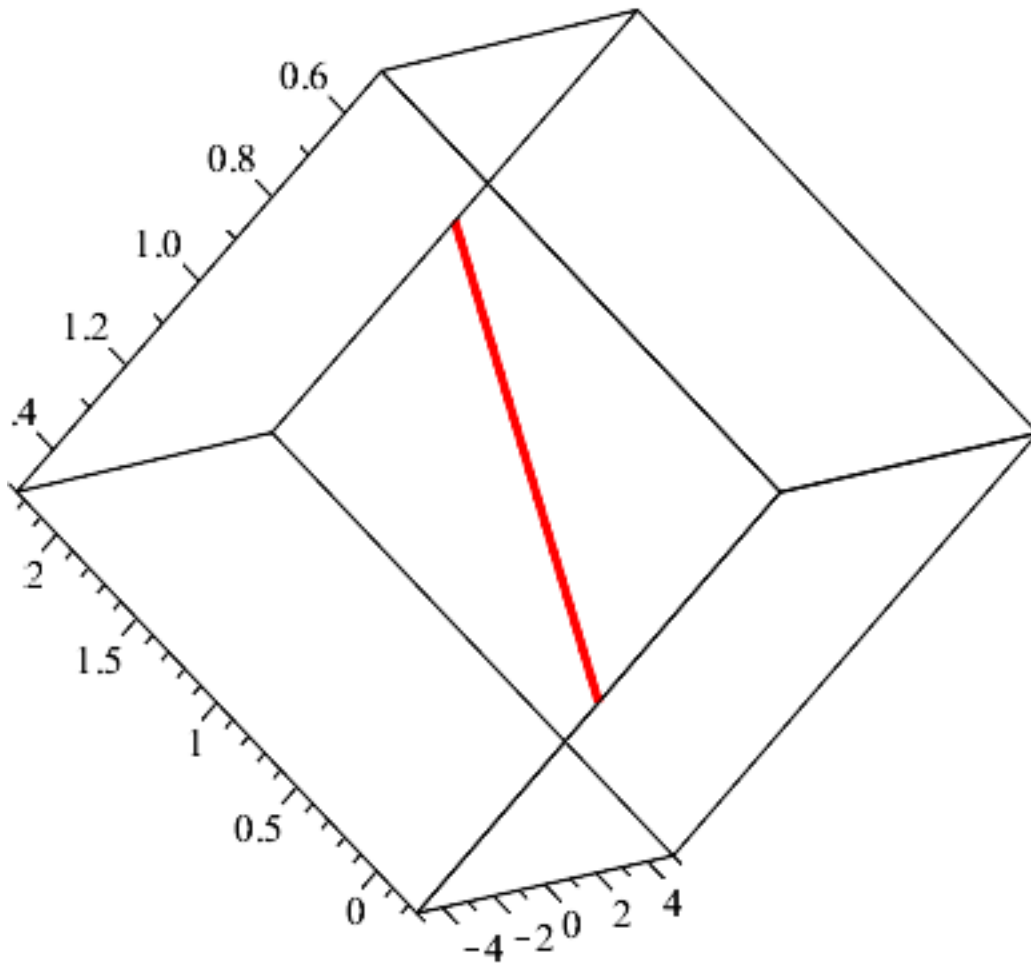
$$gtraceprime := diff(gtrace, y)$$

$$gtraceprime := \frac{1}{2\sqrt{y}} \quad (9)$$

```
plottanline := SpaceCurve( $\langle 1, t, \frac{t}{4} + 1 \rangle$ , t=-5..5, color=red, thickness=3) : %:
```

```
SpaceCurve( $\langle 1, t, \frac{t}{4} + 1 \rangle$ , t=-5..5, color=red, thickness=3)
```

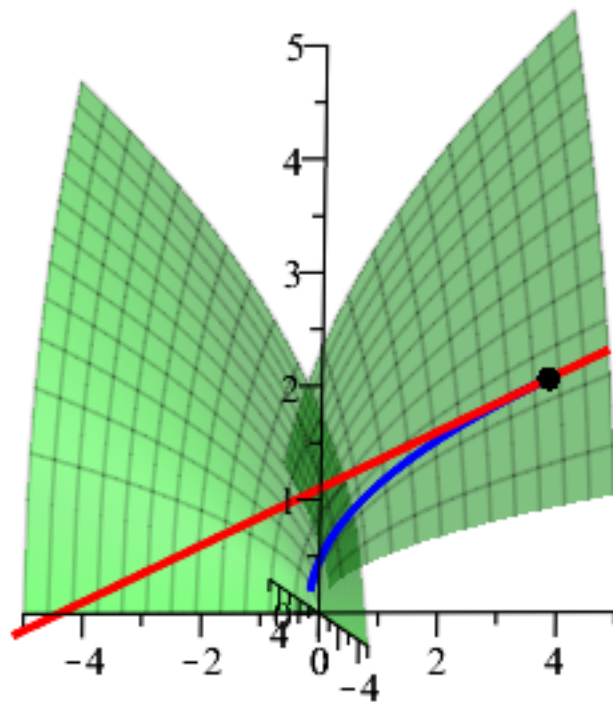
(10)



```
plottrace := SpaceCurve( $\langle 1, t, \sqrt{t} \rangle$ , t=-2..4, color=blue, thickness=3) : %:
```

```
plotthepoint := pointplot3d({[1, 4, 2]}, symbol=solidcircle, symbolsize=20, color=black) : %:
```

```
display([plotfunc, plottrace, plottanline, plotthepoint])
```

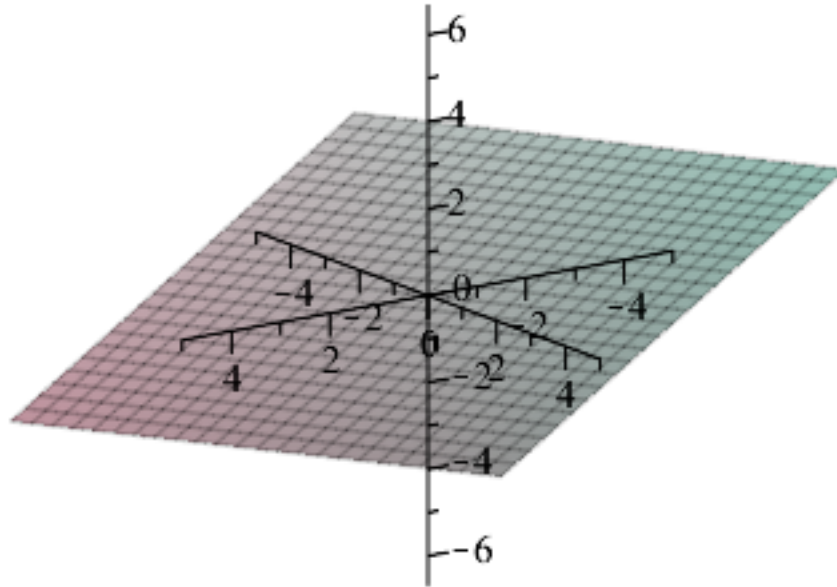


$\text{tanplane} := (x, y) \rightarrow \text{gx}(1, 4) \cdot (x - 1) + \text{gy}(1, 4) \cdot (y - 4) + 2$

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

(11)

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



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

