> $with(plots):$

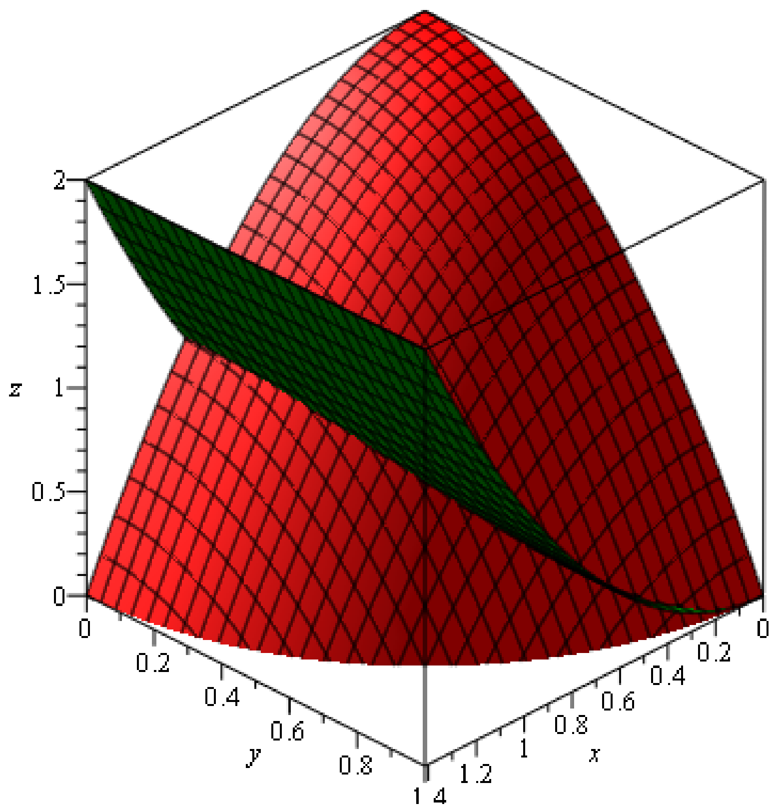
> $z1 := (x, y) \rightarrow 2 - x^2 - 2 \cdot y^2:$

> $z2 := (x, y) \rightarrow x^2:$

> $P1 := plot3d(z1(x, y), x = 0 ..\mathrm{sqrt}(2), y = 0 ..1, color = \text{"Red"}):$

> $P2 := plot3d(z2(x, y), x = 0 ..\mathrm{sqrt}(2), y = 0 ..1, color = \text{"Green"}):$

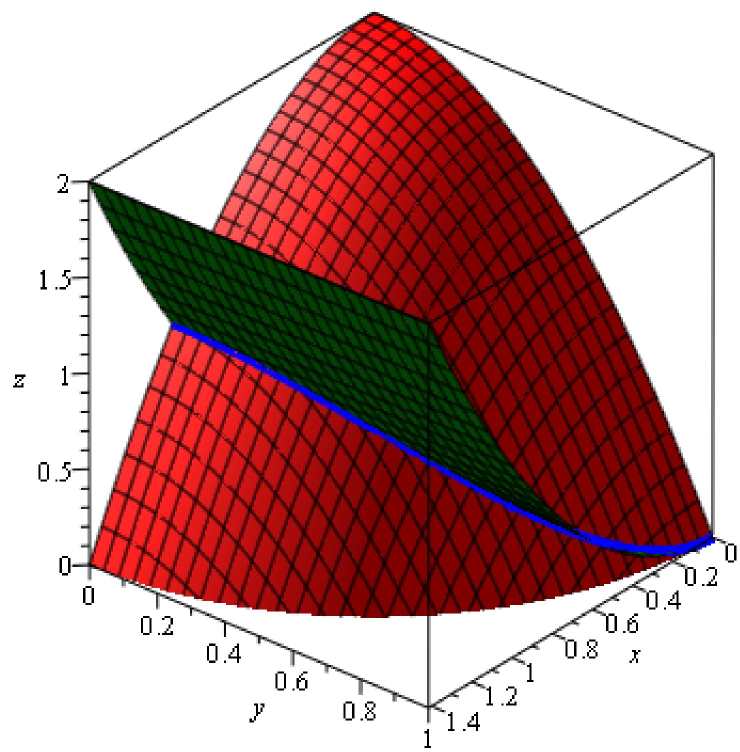
> $display(P1, P2, axes = boxed, view = [0 ..\mathrm{sqrt}(2), 0 ..1, 0 ..2], orientation = [45, 60], labels = ['x', 'y','z'])$



> $with(Student[VectorCalculus]):$

> $C := SpaceCurve(\langle t, \mathrm{sqrt}(1 - t^2), t^2\rangle, t = 0 ..1, numpoints = 1000, thickness = 4, color = \text{"Blue"}):$

> $display(P1, P2, C, view = [0 ..\mathrm{sqrt}(2), 0 ..1, 0 ..2], axes = boxed, labels = ['x','y','z'], orientation = [40, 60], caption = Kurven\ 'C')$



Kurven C

> $v := t \rightarrow \frac{\mathrm{sqrt}(1 + 4 \cdot t^2 - 4 \cdot t^4)}{\mathrm{sqrt}(1 - t^2)}$:

> $Int(t \cdot \mathrm{sqrt}(1 - t^2) \cdot v(t), t = 0 .. 1)$;
> $int(t \cdot \mathrm{sqrt}(1 - t^2) \cdot v(t), t = 0 .. 1)$;

$$\int_0^1 t \sqrt{1 + 4 t^2 - 4 t^4} \, \mathrm{d}t$$

$$\frac{1}{8} \pi + \frac{1}{4} \quad \textbf{(1)}$$

> $SetCoordinates(cartesian[x, y, z])$;

$$cartesian_{x, y, z} \quad \textbf{(2)}$$

> $\mathrm{delta} := (x, y, z) \rightarrow x \cdot y$:

> $LineInt\left(VectorField\left(\left\langle \frac{\mathrm{delta}(x, y, z)}{\mathrm{sqrt}\left(1 + \frac{x^2 \cdot (1 + 4 \cdot y^2)}{y^2}\right)}, -\frac{x}{y} \cdot \frac{\mathrm{delta}(x, y, z)}{\mathrm{sqrt}\left(1 + \frac{x^2 \cdot (1 + 4 \cdot y^2)}{y^2}\right)}, \right.\right.\right.$

$$\frac{2 \cdot x \cdot \mathrm{delta}(x, y, z)}{\mathrm{sqrt}\left(1 + \frac{x^2 \cdot (1 + 4 \cdot y^2)}{y^2}\right)} \Bigg\rangle\Bigg), Path\left(\langle t, \mathrm{sqrt}(1 - t^2), t^2\rangle, t = 0..1\right), output = integral\Bigg)$$

$$\int_0^1 \left(\frac{t\sqrt{1-t^2}}{\sqrt{1 + \frac{t^2 (5 - 4t^2)}{1-t^2}}} + \frac{t^3}{\sqrt{1 + \frac{t^2 (5-4t^2)}{1-t^2}}\,\sqrt{1-t^2}} + \frac{4t^3\sqrt{1-t^2}}{\sqrt{1+\frac{t^2(5-4t^2)}{1-t^2}}} \right) \mathrm{d}t \qquad \textbf{(3)}$$

> *simplify*(%)

$$\int_0^1 t\sqrt{1 + 4t^2 - 4t^4}\,\mathrm{d}t \qquad \textbf{(4)}$$

> $LineInt\left(VectorField\left(\left\langle \frac{\mathrm{delta}(x, y, z)}{\mathrm{sqrt}\left(1 + \frac{x^2 \cdot (1 + 4 \cdot y^2)}{y^2}\right)}, -\frac{x}{y} \cdot \frac{\mathrm{delta}(x, y, z)}{\mathrm{sqrt}\left(1 + \frac{x^2 \cdot (1 + 4 \cdot y^2)}{y^2}\right)}, \frac{2 \cdot x \cdot \mathrm{delta}(x, y, z)}{\mathrm{sqrt}\left(1 + \frac{x^2 \cdot (1 + 4 \cdot y^2)}{y^2}\right)} \right\rangle\right), Path\left(\langle t, \mathrm{sqrt}(1 - t^2), t^2\rangle, t = 0..1\right), output = value\right)$

$$\frac{1}{8}\pi + \frac{1}{4} \qquad \textbf{(5)}$$

>