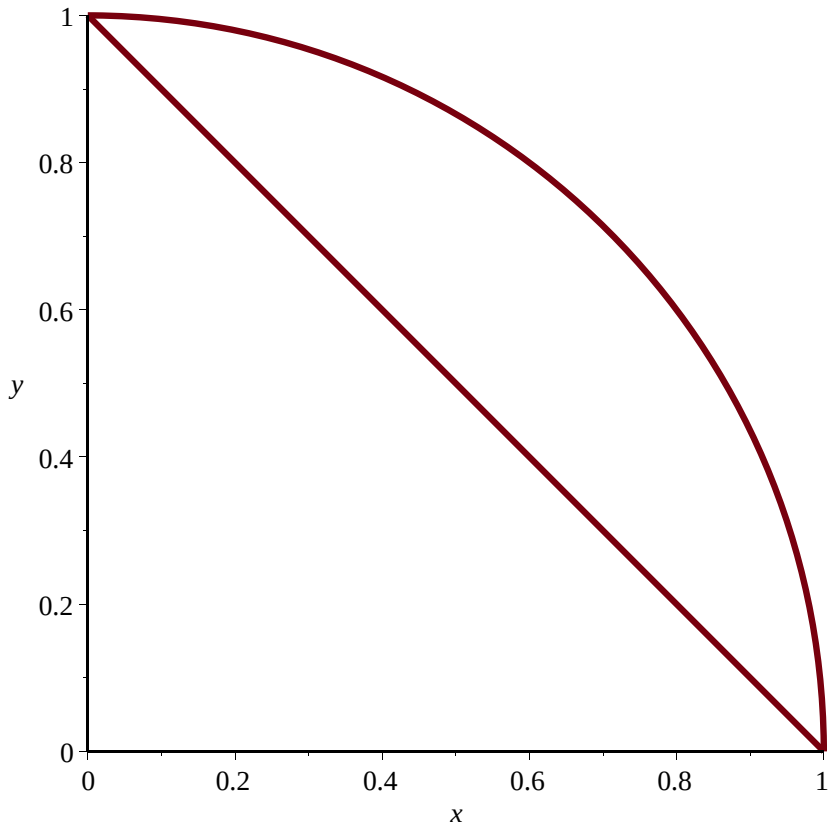
```
> with(plots):
> with(Student[MultivariateCalculus]):
> K1 := plot([cos(t), sin(t), t = 0 .. Pi/2], thickness = 3):
> K2 := plot([t, 1 - t, t = 0 ..1], thickness = 3):
> display(K1, K2, view = [0 ..1, 0 ..1], labels = [x, y]);
```




```
> M := (x, y) → 2·x + 2·y:
> N := (x, y) → 6 ·x·y + 2·x − cos(y):
> MultiInt(diff(N(x, y), x) − diff(M(x, y), y), y = 1 − x ..sqrt(1 − x^2), x = 0 ..1, output = steps);
```

$$\int_0^1 \int_{1-x}^{\sqrt{1-x^2}} 6\,y\,dy\,dx$$

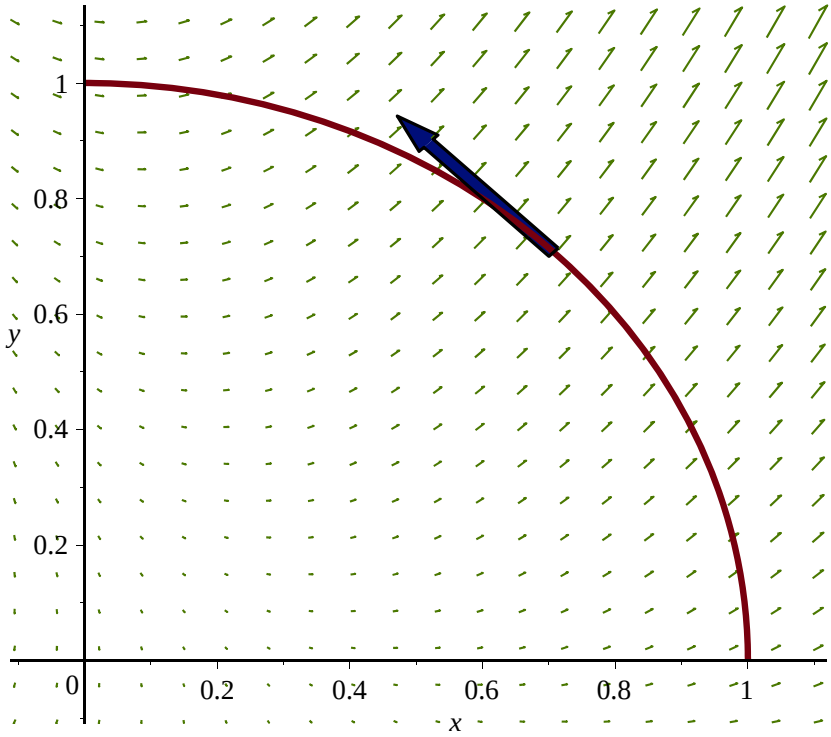
$$= \int_0^1 \left(3\,y^2 \Big|_{y=1-x..\sqrt{1-x^2}} \right) dx$$

$$= \int_0^1 \left(3 - 3\,x^2 - 3\,(1-x)^2\right) dx$$

$$= \left(3\,x - x^3 + (1-x)^3\right) \Big|_{x=0..1}$$

$$1 \qquad \textbf{(1)}$$

```
> with(Student[VectorCalculus]):
> LineInt(VectorField(<M(x,y), N(x,y)>), Path(<cos(t), sin(t)>, t = 0 .. Pi/2), output = plot);
  LineInt(VectorField(<M(x,y), N(x,y)>), Path(<cos(t), sin(t)>, t = 0 .. Pi/2), output
      = integral);
  LineInt(VectorField(<M(x,y), N(x,y)>), Path(<cos(t), sin(t)>, t = 0 .. Pi/2));
```

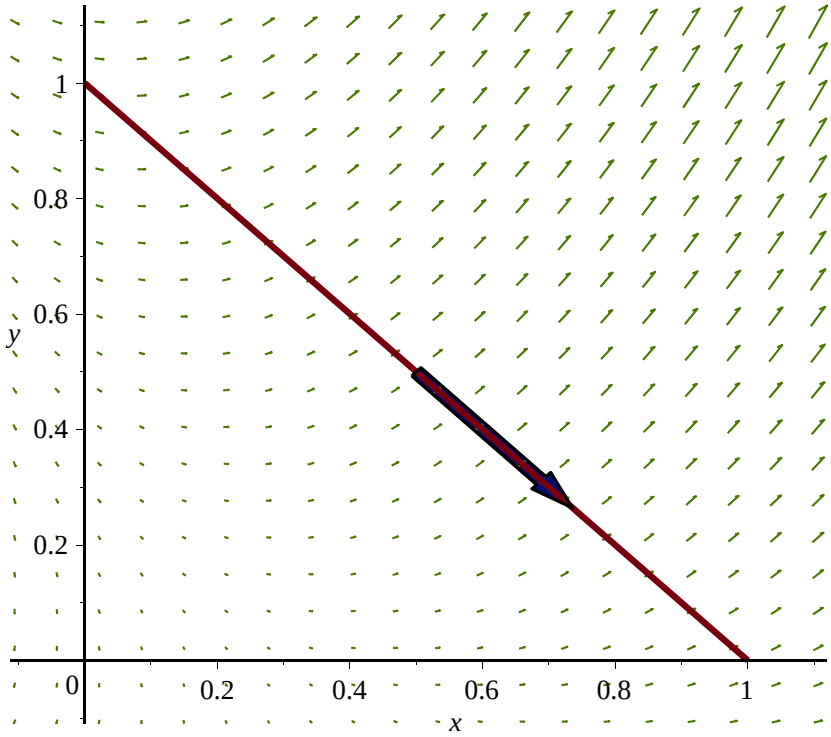


The path of integration, vector(s) tangent to the path, and vector-field arrows

$$\int_0^{\frac{1}{2}\pi} (-(2\cos(t)+2\sin(t))\sin(t)+(6\cos(t)\sin(t)+2\cos(t)-\cos(\sin(t)))\cos(t))\,dt$$

$$1-\sin(1) \qquad \textbf{(2)}$$

```
> LineInt(VectorField(⟨M(x, y), N(x, y)⟩), Line(⟨0, 1⟩, ⟨1, 0⟩), output = plot);
  LineInt(VectorField(⟨M(x, y), N(x, y)⟩), Line(⟨0, 1⟩, ⟨1, 0⟩), output = integral);
  LineInt(VectorField(⟨M(x, y), N(x, y)⟩), Line(⟨0, 1⟩, ⟨1, 0⟩));
```



The path of integration, vector(s) tangent to the path, and vector-field arrows

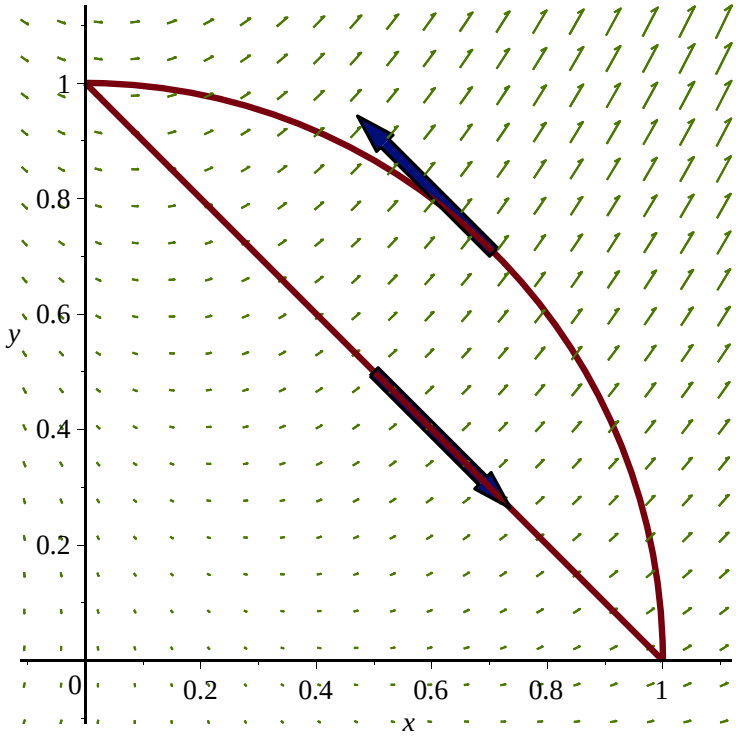
$$\int_0^1 (2 - 6\,t\,(1-t) - 2\,t + \cos(-1+t))\,dt$$

$$\sin(1) \tag{3}$$

> **(2) + (3)**

$$1 \tag{4}$$

> $display\left(LineInt\left(VectorField(\langle M(x,y), N(x,y)\rangle), Path\left(\langle \cos(t), \sin(t)\rangle, t = 0..\frac{Pi}{2}\right), output = plot\right), LineInt(VectorField(\langle M(x,y), N(x,y)\rangle), Line(\langle 0, 1\rangle, \langle 1, 0\rangle), output = plot), scaling = constrained\right)$



The path of integration, vector(s) tangent to the path, and vector-field arrows

>