```
> restart : with(LinearAlgebra) : with(VectorCalculus) :
  SetCoordinates(cartesian[x, y, z]) :
> f := VectorField([x·(x^2 − y^2), −y·(x^2 − y^2), 0])
```

$$f := (x\,(x^2 - y^2))\,\bar{e}_x + (-y\,(x^2 - y^2))\,\bar{e}_y + (0)\,\bar{e}_z \tag{1}$$

```
> Curl(f)
```

$$(0)\,\bar{e}_x + (0)\,\bar{e}_y + (0)\,\bar{e}_z \tag{2}$$

```
> # Here we proved that the Rotor is nul, dus we hebben een conservatief
      veld!
> # Nu calculeren we phi
  restart : with(LinearAlgebra) : with(VectorCalculus) :
  SetCoordinates(cartesian[x, y, z]) :
> phi_x := int(x^3 − x*y^2, x);
```

$$phi\_x := \frac{1}{4}\,x^4 - \frac{1}{2}\,x^2\,y^2 \tag{3}$$

```
> phi := (x^4 / 4) − (x^2 * y^2 / 2) + f(y);
```

$$\phi := \frac{x^4}{4} - \frac{x^2\,y^2}{2} + f(y) \tag{4}$$

```
> eq := diff(phi, y) = −x^2*y + y^3;
```

$$eq := -x^2\,y + \frac{\mathrm{d}}{\mathrm{d}y}\,f(y) = -x^2\,y + y^3 \tag{5}$$

```
> f_prime := solve(eq, diff(f(y), y));
```

$$f\_prime := y^3 \tag{6}$$

```
> f_y := int(f_prime, y) # + Const
```

$$f\_y := \frac{y^4}{4} \tag{7}$$

```
> phi := (x^4 / 4) − (x^2 * y^2 / 2) + f_y; # +Const
```

$$\phi := \frac{1}{4}\,x^4 - \frac{1}{2}\,x^2\,y^2 + \frac{1}{4}\,y^4 \tag{8}$$

```
>
```