```
> Int(Int(x^2+y^2+x*y,x=-1..2),y=-2..3)=int(int(x^2+y^2+x*y,x=-1..2),y=-2..3);
```

$$\int_{-2}^{3}\int_{-1}^{2}\left(x^2+y^2+x\,y\right)\,\mathrm{d}x\,\mathrm{d}y=\frac{215}{4}$$

```
> Int(Int(exp(x^2),x=y..1),y=0..1)=int(int(exp(x^2),x=y..1),y=0..1);
```

$$\int_{0}^{1}\int_{y}^{1}\mathrm{e}^{x^2}\,\mathrm{d}x\,\mathrm{d}y=\frac{1}{2}\,\mathrm{e}-\frac{1}{2}$$

```
> Int(Int(exp(x^2),y=0..x),x=0..1)=int(int(exp(x^2),y=0..x),x=0..1);
```

$$\int_{0}^{1}\int_{0}^{x}\mathrm{e}^{x^2}\,\mathrm{d}y\,\mathrm{d}x=\frac{1}{2}\,\mathrm{e}-\frac{1}{2}$$

```
> Int(Int(exp(x^2),y=0..x),x=0..1)=Int(int(exp(x^2),y=0..x),x=0..1);
```

$$\int_{0}^{1}\int_{0}^{x}\mathrm{e}^{x^2}\,\mathrm{d}y\,\mathrm{d}x=\int_{0}^{1}\mathrm{e}^{x^2}\,x\,\mathrm{d}x$$

```
> Int(Int(exp(x/y),y=sqrt(x)..1),x=0..1)=int(int(exp(x/y),y=sqrt(x)..1),x=0..1);
```

$$\int_{0}^{1}\int_{\sqrt{x}}^{1}\mathrm{e}^{\frac{x}{y}}\,\mathrm{d}y\,\mathrm{d}x=\frac{1}{2}$$

```
> Int(Int(exp(x/y),x=0..y^2),y=0..1)=Int(int(exp(x/y),x=0..y^2),y=0..1);
```

$$\int_{0}^{1}\int_{0}^{y^2}\mathrm{e}^{\frac{x}{y}}\,\mathrm{d}x\,\mathrm{d}y=\int_{0}^{1}\left(-y+y\,\mathrm{e}^{y}\right)\,\mathrm{d}y$$

```
> Int(Int(exp(sqrt(x^2+y^2)),x=-sqrt(y^2-1)..sqrt(y^2-1)),y=-1..1)
=int(int(exp(sqrt(x^2+y^2)),x=-sqrt(y^2-1)..sqrt(y^2-1)),y=-1..1);
```

$$\int_{-1}^{1}\int_{-\sqrt{y^2-1}}^{\sqrt{y^2-1}}\mathrm{e}^{\sqrt{x^2+y^2}}\,\mathrm{d}x\,\mathrm{d}y=\int_{-1}^{1}\int_{-\sqrt{y^2-1}}^{\sqrt{y^2-1}}\mathrm{e}^{\sqrt{x^2+y^2}}\,\mathrm{d}x\,\mathrm{d}y$$

```
> Int(Int(r*exp(r),r=0..1),theta=0..2*Pi)=int(int(r*exp(r),r=0.
.1),theta=0..2*Pi);
```

$$\int_{0}^{2\pi}\int_{0}^{1} r\,e^{r}\,dr\,d\theta = 2\pi$$

```
> restart:
> v:=x^2/y;
```

$$v := \frac{x^2}{y}$$

```
> u:=y^2/x;
```

$$u := \frac{y^2}{x}$$

```
> with(linalg):
> jacobian([u,v],[x,y]);
```

$$\begin{bmatrix} -\frac{y^2}{x^2} & \frac{2y}{x} \\ \frac{2x}{y} & -\frac{x^2}{y^2} \end{bmatrix}$$

```
> det(%);
```

$$-3$$

```
> abs(%);
```

$$3$$

```
> with(student):
> Int(Int(3*x*sin(y*x),y=1/2..1),x=Pi/2..Pi)=int(int(3*x*sin(y*x),
y=1/2..1),x=Pi/2..Pi);
```

$$\int_{\frac{1}{2}\pi}^{\pi}\int_{\frac{1}{2}}^{1} 3\,x\sin(y\,x)\,dy\,dx = -3\sqrt{2}+9$$

```
> evalf(%);
```

$$4.757359313 = 4.757359314$$

```
> Doubleint(3*x*sin(y*x),y=1/2..1,x=Pi/2..Pi);
```

$$\int_{\frac{1}{2}\pi}^{\pi}\int_{\frac{1}{2}}^{1} 3\,x\sin(y\,x)\,dy\,dx$$

```
> evalf(%);
```

$$4.757359313$$

```
> Int(Int(Int(x+y^3-z^2+4,x=1..2),y=0..1),z=2..3)=int(int(int(x+
```

```
y^3-z^2+4,x=1..2),y=0..1),z=2..3);
```

$$\int_2^3\int_0^1\int_1^2 \left(x+y^3-z^2+4\right)\,dx\,dy\,dz = -\frac{7}{12}$$

```
> Int(Int(Int(1,z=sqrt(x^2+y^2)..5),y=-sqrt(25-x^2)..sqrt(25-x^2)
  ),x=-5..5)=int(int(int(1,z=sqrt(x^2+y^2)..5),y=-sqrt(25-x^2)..
  sqrt(25-x^2)),x=-5..5);
```

$$\int_{-5}^{5}\int_{-\sqrt{25-x^2}}^{\sqrt{25-x^2}}\int_{\sqrt{x^2+y^2}}^{5} 1\,dz\,dy\,dx = \int_{-5}^{5}\left(\frac{1}{2}\,x^2\ln\left(-\sqrt{25-x^2}+5\right)+5\sqrt{25-x^2}\right.$$
$$\left.-\frac{1}{2}\,x^2\ln\left(\sqrt{25-x^2}+5\right)\right)dx$$

```
> Int(Int(Int(1,y=-sqrt(z^2-x^2)..sqrt(z^2-x^2)),x=-z..z),z=0..5)=
  int(int(int(1,y=-sqrt(z^2-x^2)..sqrt(z^2-x^2)),x=-z..z),z=0..5);
```

```
> Int(Int(Int(1, y = (-(z^2-x^2)^(1/2) .. (z^2-x^2)^(1/2))), x =
  (-z .. z)), z = (0 .. 5))=int(int(int(1, y = (-(z^2-x^2)^(1/2) .
  . (z^2-x^2)^(1/2))), x = (-z .. z)), z = (0 .. 5));
```

$$\int_0^5\int_{-z}^{z}\int_{-\sqrt{z^2-x^2}}^{\sqrt{z^2-x^2}} 1\,dy\,dx\,dz = \frac{125}{3}\,\pi$$