```
> restart;
> f:=int(sqrt(tan(x)),x);
```

$$f := \frac{1}{2}\,\frac{\sqrt{\tan(x)}\,\cos(x)\,\sqrt{2}\,\arccos(\cos(x)-\sin(x))}{\sqrt{\cos(x)\,\sin(x)}} - \frac{1}{2}\,\sqrt{2}\,\ln\left(\cos(x) + \sqrt{2}\,\sqrt{\tan(x)}\,\cos(x) + \sin(x)\right) \tag{1}$$

```
> g:=diff(f,x);
```

$$g := \frac{1}{4}\,\frac{\cos(x)\,\sqrt{2}\,\arccos(\cos(x)-\sin(x))\,\left(1+\tan(x)^2\right)}{\sqrt{\tan(x)}\,\sqrt{\cos(x)\,\sin(x)}} \tag{2}$$

$$- \frac{1}{4}\,\frac{\sqrt{\tan(x)}\,\cos(x)\,\sqrt{2}\,\arccos(\cos(x)-\sin(x))\,\left(-\sin(x)^2+\cos(x)^2\right)}{(\cos(x)\,\sin(x))^{3/2}}$$

$$- \frac{1}{2}\,\frac{\sqrt{\tan(x)}\,\sin(x)\,\sqrt{2}\,\arccos(\cos(x)-\sin(x))}{\sqrt{\cos(x)\,\sin(x)}}$$

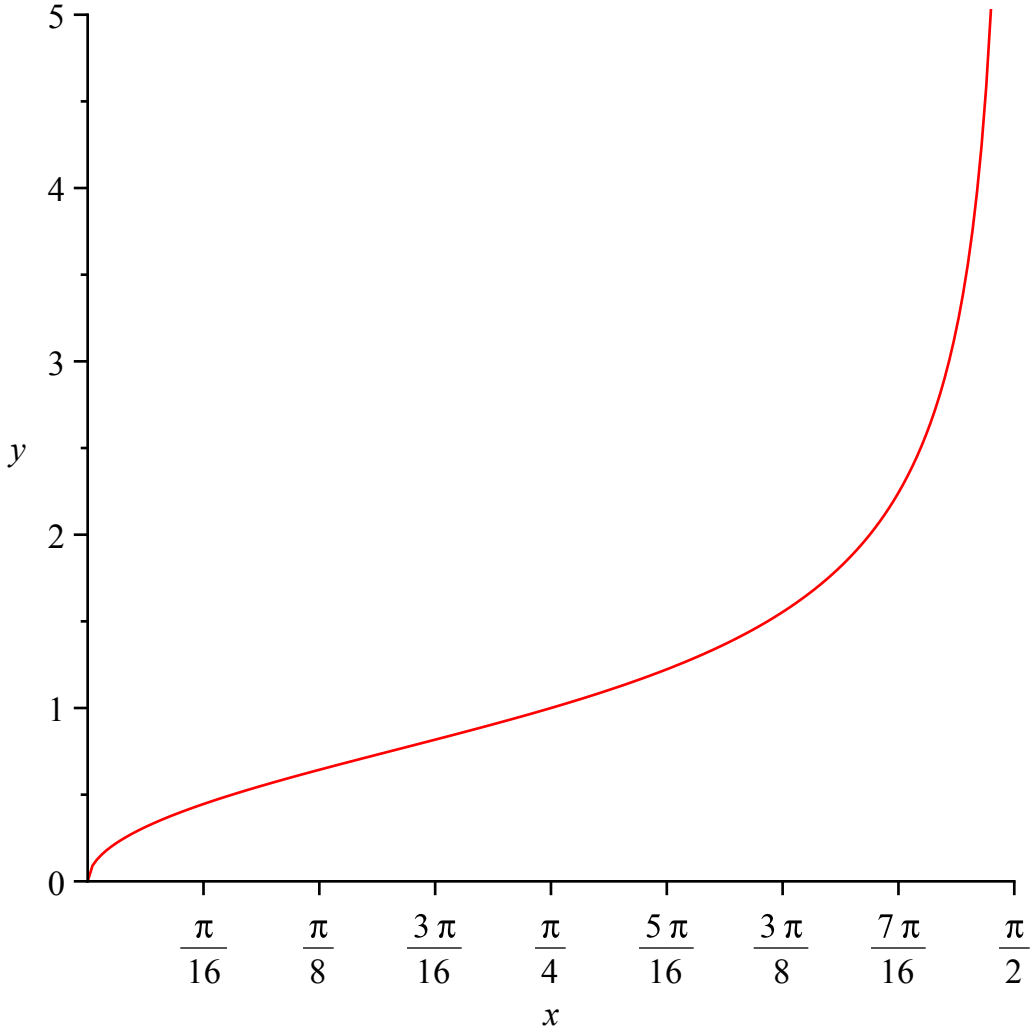
$$- \frac{1}{2}\,\frac{\sqrt{\tan(x)}\,\cos(x)\,\sqrt{2}\,(-\sin(x)-\cos(x))}{\sqrt{\cos(x)\,\sin(x)}\,\sqrt{1-(\cos(x)-\sin(x))^2}}$$

$$- \frac{1}{2}\,\frac{\sqrt{2}\left(-\sin(x) + \frac{1}{2}\,\frac{\sqrt{2}\,\cos(x)\,\left(1+\tan(x)^2\right)}{\sqrt{\tan(x)}} - \sqrt{2}\,\sqrt{\tan(x)}\,\sin(x) + \cos(x)\right)}{\cos(x) + \sqrt{2}\,\sqrt{\tan(x)}\,\cos(x) + \sin(x)}$$

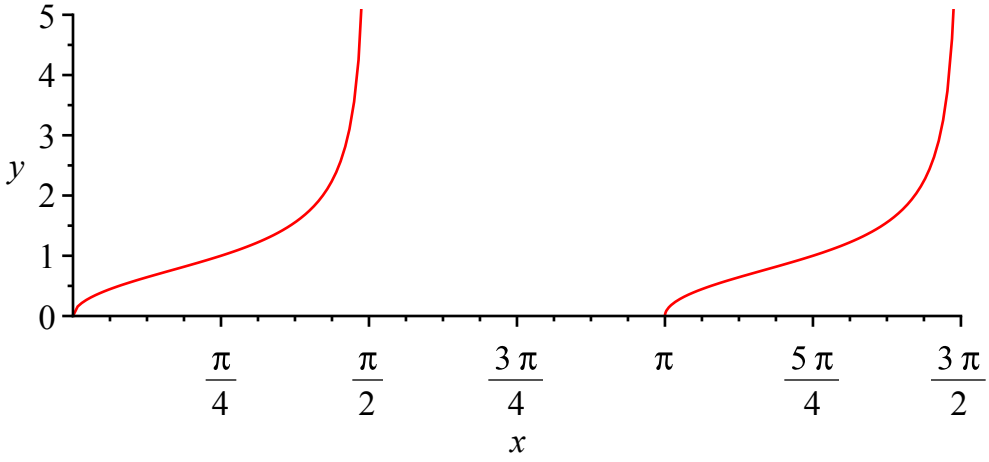
```
> h:=sqrt(tan(x));
```

$$h := \sqrt{\tan(x)} \tag{3}$$

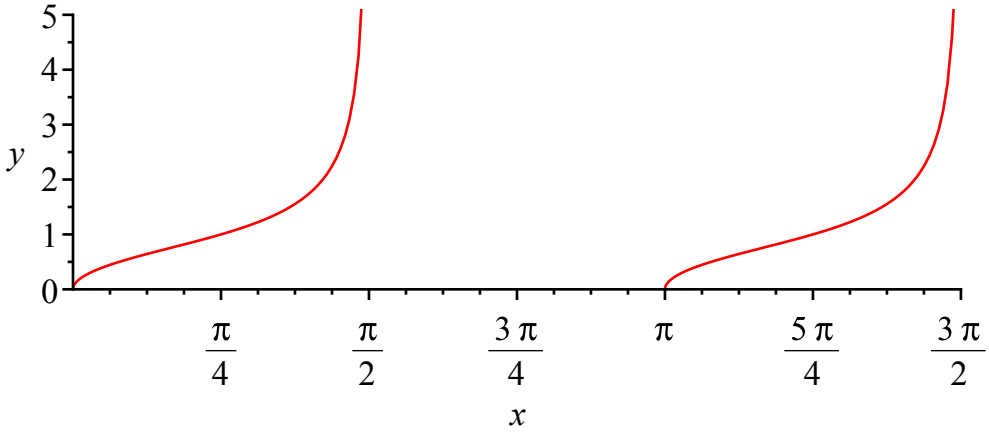
```
> plot(h,x=0..Pi/2,y=0..5);
```




```
> plot(h,x=0..3*Pi/2,y=0..5);
```




```
> plot(g,x=0..3*Pi/2,y=0..5);
```




```
> simplify(g);
```

$$-\frac{1}{2}\left(-\sqrt{2}\cos(x)\sin(x)\sqrt{\cos(x)\sin(x)}\sqrt{\frac{\sin(x)}{\cos(x)}}\right. \tag{4}$$

$$+\sqrt{2}\cos(x)^3\sin(x)\sqrt{\cos(x)\sin(x)}\sqrt{\frac{\sin(x)}{\cos(x)}}$$

$$-\sin(x)^3\cos(x)\sqrt{\frac{\sin(x)}{\cos(x)}}\sqrt{\cos(x)\sin(x)}\sqrt{2}-2\sin(x)^2\sqrt{\cos(x)\sin(x)}$$

$$+2\cos(x)^2\sin(x)^2\sqrt{\cos(x)\sin(x)}-2\cos(x)\sin(x)\sqrt{\cos(x)\sin(x)}$$

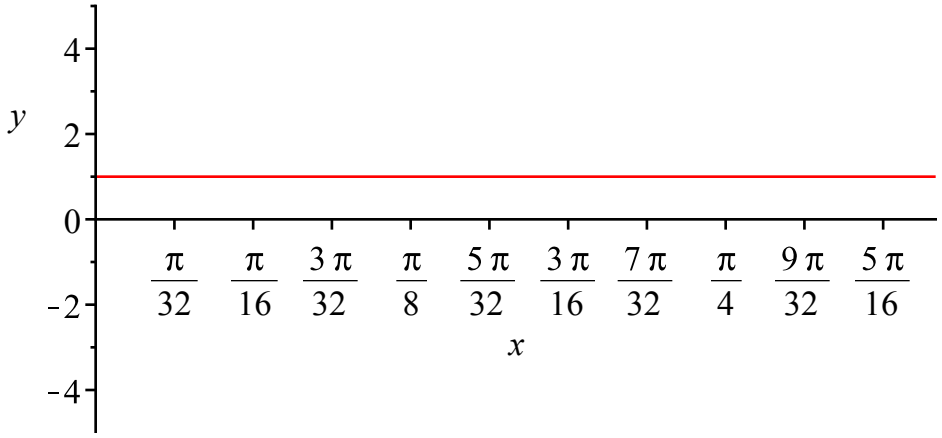
$$+2\cos(x)^3\sin(x)\sqrt{\cos(x)\sin(x)}+\sin(x)^2\cos(x)\sqrt{\frac{\sin(x)}{\cos(x)}}\arccos(\cos(x)-\sin(x))$$

$$+\cos(x)^3\arccos(\cos(x)-\sin(x))\sqrt{\frac{\sin(x)}{\cos(x)}}-\arccos(\cos(x))$$

$$\left.-\sin(x))\cos(x)\sqrt{\frac{\sin(x)}{\cos(x)}}\right)\Big/\left(\cos(x)\sin(x)^2\sqrt{\cos(x)\sin(x)}\left(\sqrt{\frac{\sin(x)}{\cos(x)}}\cos(x)\right.\right.$$

$$\left.\left.+\sqrt{2}\sin(x)+\sin(x)\sqrt{\frac{\sin(x)}{\cos(x)}}\right)\right)$$

```
> plot(1+h-g,x=0..Pi/3,y=-5..5);
```




```
> simplify(h-g);
```

$$0 \tag{5}$$

```
> f2:=int(exp(x)/arctan(x),x);
```

$$f2 := \int \frac{e^x}{\arctan(x)}\, dx \tag{6}$$

```
> diff(f2,x);
```

$$\frac{e^x}{\arctan(x)} \tag{7}$$

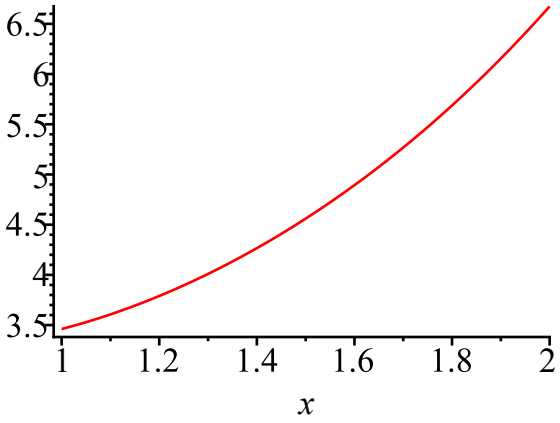
```
> f3:=int(exp(x)/arctan(x),x=1..t);
```

$$f3 := \int_1^t \frac{e^x}{\arctan(x)}\, dx \tag{8}$$

```
> diff(f3,t);
```

$$\frac{e^t}{\arctan(t)} \tag{9}$$

```
> plot(exp(x)/arctan(x),x=1..2);
```




```
> A2:=int(exp(x)/arctan(x),x=1..2);
```

$$A2 := \int_1^2 \frac{e^x}{\arctan(x)}\, dx \tag{10}$$

```
> evalf(A2);
```

$$4.726828650 \tag{11}$$

```
> Digits:=50;
```

$$Digits := 50 \tag{12}$$

```
> evalf(A2);
```

$$4.7268286495324402347743321196209711560050297579289 \tag{13}$$

```
> Digits:=10;
```

$$Digits := 10 \tag{14}$$

```
> int(1/sqrt(1+x^2),x);
```

$$\operatorname{arcsinh}(x) \tag{15}$$

```
> A3:=int(1/sqrt(1+x^2),x=0..5);
```

$$A3 := \ln(2) + \ln(5) + \ln\left(\frac{1}{2} + \frac{1}{10}\sqrt{13}\,\sqrt{2}\right) \tag{16}$$

```
> evalf(A3);
```

$$2.312438341 \tag{17}$$