```
> restart;
> # Work a complicated antiderivative related to surface area
> f := tan(x);
```

$$f := \tan(x)$$

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

$$dfdx := 1 + \tan(x)^2$$

```
> P := int(f*sqrt(1+dfdx^2), x);
```

$$P := \frac{1}{2}\sqrt{1 + (1 + \tan(x)^2)^2} - \frac{1}{2}\operatorname{arctanh}\left(\frac{1}{\sqrt{1 + (1 + \tan(x)^2)^2}}\right)$$

```
> F2 := diff(P, x);
```

$$F2 := \frac{(1 + \tan(x)^2)^2 \tan(x)}{\sqrt{1 + (1 + \tan(x)^2)^2}} + \frac{(1 + \tan(x)^2)^2 \tan(x)}{\left(1 + (1 + \tan(x)^2)^2\right)^{(3/2)} \left(1 - \frac{1}{1 + (1 + \tan(x)^2)^2}\right)}$$

```
> simplify(F2);
```

$$\tan(x)\sqrt{2 + 2\tan(x)^2 + \tan(x)^4}$$

```
> F3:=tan(x)*sqrt(1+sec(x)^4);
```

$$F3 := \tan(x)\sqrt{1 + \sec(x)^4}$$

```
> simplify(F2-F3);
```

$$0$$

```
> F:=unapply(P,x);
```

$$F := x \rightarrow \frac{1}{2}\sqrt{1 + (1 + \tan(x)^2)^2} - \frac{1}{2}\operatorname{arctanh}\left(\frac{1}{\sqrt{1 + (1 + \tan(x)^2)^2}}\right)$$

```
> A1:=F(2*Pi/5)-F(Pi/7);
```

$$A1 := \frac{1}{2}\sqrt{1 + \left(1 + \tan\left(\frac{2}{5}\pi\right)^2\right)^2} - \frac{1}{2}\operatorname{arctanh}\left(\frac{1}{\sqrt{1 + \left(1 + \tan\left(\frac{2}{5}\pi\right)^2\right)^2}}\right)$$

$$-\frac{1}{2}\sqrt{1+\left(1+\tan\left(\frac{1}{7}\pi\right)^2\right)^2}+\frac{1}{2}\operatorname{arctanh}\left(\frac{1}{\sqrt{1+\left(1+\tan\left(\frac{1}{7}\pi\right)^2\right)^2}}\right)$$

```
> simplify(A1);
```

$$-\frac{1}{2\cos\left(\frac{2}{5}\pi\right)^2\cos\left(\frac{1}{7}\pi\right)^2}\left(-\sqrt{\cos\left(\frac{2}{5}\pi\right)^4+1}\,\cos\left(\frac{1}{7}\pi\right)^2\right.$$
$$+\operatorname{arctanh}\left(\frac{\cos\left(\frac{2}{5}\pi\right)^2}{\sqrt{\cos\left(\frac{2}{5}\pi\right)^4+1}}\right)\cos\left(\frac{2}{5}\pi\right)^2\cos\left(\frac{1}{7}\pi\right)^2$$
$$+\sqrt{\cos\left(\frac{1}{7}\pi\right)^4+1}\,\cos\left(\frac{2}{5}\pi\right)^2$$
$$\left.-\operatorname{arctanh}\left(\frac{\cos\left(\frac{1}{7}\pi\right)^2}{\sqrt{\cos\left(\frac{1}{7}\pi\right)^4+1}}\right)\cos\left(\frac{2}{5}\pi\right)^2\cos\left(\frac{1}{7}\pi\right)^2\right)$$

```
> evalf(A1);
```

$$4.789770537$$

```
> Digits:=100;
```

$$Digits := 100$$

```
> evalf(A1);
```

4.789770519843985097074046348237279068311813968436435413137424254938409871122113863065957206594442 98

```
> restart;
> # Find an antiderivative
> int(ln(x)^2,x);
```

$$\ln(x)^2 x - 2x\ln(x) + 2x$$

```
> restart;
> # Work an arc length problem
> f:=y^3/21+7/(4*y);
  dfdy:=diff(f,y);
```

$$f := \frac{1}{21}y^3 + \frac{7}{4y}$$

$$dfdy := \frac{1}{7}y^2 - \frac{7}{4y^2}$$

```
> int(sqrt(dfdy^2+1),y=3..5);
```

$$\frac{49}{10}$$

```
>
```