Mais soma de Riemann

Somas de Riemann

Aqui temos procedimentos para plotar somas de Riemann

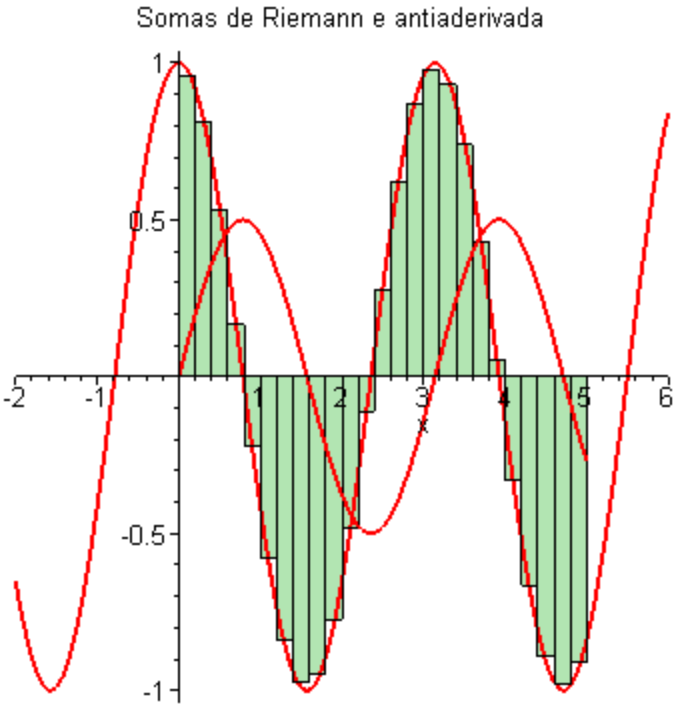
Vejamos alguns exemplos

Exemplos

```
> with(student):
```

```
i1 := Int( cos(2*t), t=0 .. x): i1 = value(i1);
f1 := unapply( value(i1), x ):
p1 := middlebox(cos(2*x), x = 0 .. 5, 25):
p2 := plot( f1(x), x = 0 .. 5, thickness = 2 ):
p3 := plot( cos(2*x), x = -2 .. 6, thickness = 2 ):
plots[display]({p1, p2, p3}, title=`Somas de Riemann e antiaderivada` );
```

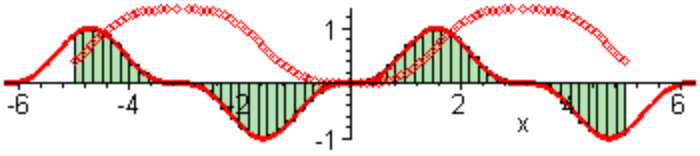
$$\int_0^x \cos(2\,t)\,dt = \sin(x)\,\cos(x)$$



Exemplos

```
> i2 := Int(sin(t)^3, t=0 .. x): i2 = `?`;
f2 := unapply( value(i2), x ):
p1 := plot(sin(x)^3, x = -2*Pi .. 2*Pi, thickness = 3):
p2 := middlebox(sin(x)^3, x = -5..5, 60, thickness = 2):
p3 := plot(f2(x), x = -5..5, style=point):
plots[display]({p1, p2, p3}, scaling=constrained);
```

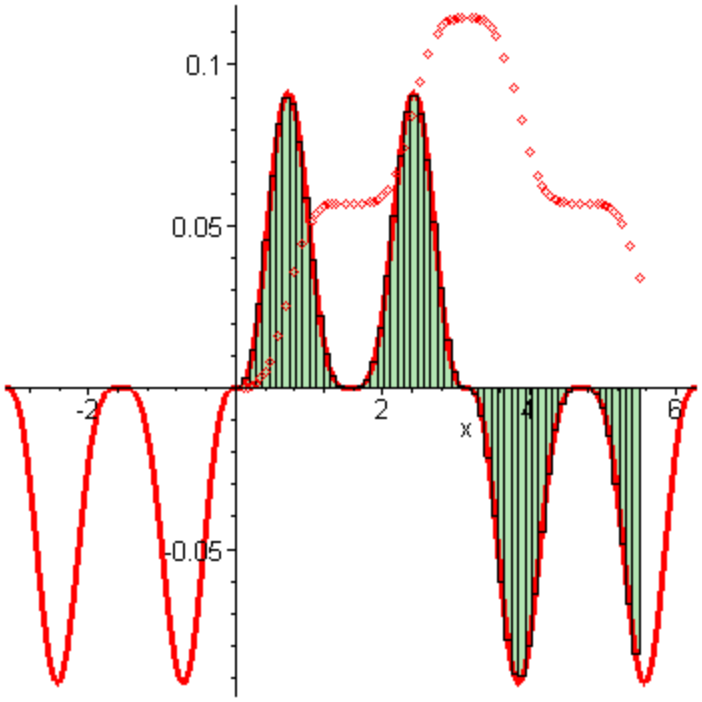
$$\int_0^x \sin(t)^3\, dt = ?$$



Exemplos

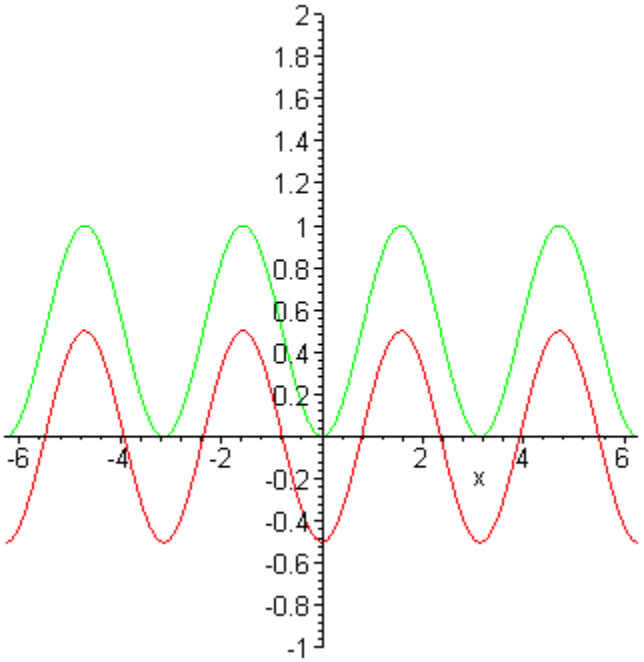
```
> i3 := Int(sin(t)^3 * cos(t)^4, t=0 .. x): i3 = `?`;
f3 := unapply( value(i3), x ):
p4 := plot(sin(x)^3 * cos(x)^4, x = -Pi .. 2*Pi, thickness = 3):
p5 := middlebox(sin(x)^3 * cos(x)^4, x = 0..5.5, 60, thickness = 2):
p6 := plot(f3(x), x = 0..5.5, style=point):
plots[display]({p4, p5, p6});

Int( cos(2*t), t = 0 .. x);

plot( {sin(x)^2, -cos(2*x)/2}, x = -2*Pi .. 2*Pi, -1 .. 2,
title=`( sin(x) )^2 e -cos(2*x)/2` );
```

$$\int_0^x \sin(t)^3 \cos(t)^4 \, dt = ?$$



$$\int_0^x \cos(2\,t)\,dt$$

(sin(x))^2 e -cos(2*x)/2



Exemplos

> **i4 := Int(cos(x)^2, x): i4 = value(i4);**

```
eq0 := sin(x)^2 + cos(x)^2 = 1: eq0, ``;

eq1 := sin(A + B) = expand(sin(A + B)): eq1;
eq2 := cos(A + B) = expand(cos(A + B)): eq2;
eq3 := subs(A = x, B=x, eq1): eq3;
eq4 := subs(A = x, B=x, eq2): eq4;

eq5 := isolate(eq4, sin(x)^2):
eq6 := isolate(eq0, cos(x)^2):
eq7 := isolate( subs(eq6, eq5), sin(x)^2): eq7;
eq8 := isolate(eq4, cos(x)^2):
eq9 := isolate(eq0, sin(x)^2):
eq10 := isolate(subs(eq9, eq8), cos(x)^2): eq10;

i5 := subs(eq10, i4): i4 = i5; `` = value(i5);
p7 := middlebox(cos(x)^2, x = -1 .. 2.5, 18):
p8 := plot( value(i5), x = -1 .. 2.5, thickness = 2 ):
plots[display]({p7, p8}, title=`Somas de Riemann e Antiderivada` );
```

$$\int \cos(x)^2\,dx = \frac{1}{2}\sin(x)\cos(x) + \frac{1}{2}x$$

$$\sin(x)^2 + \cos(x)^2 = 1,$$

$$\sin(A+B) = \sin(A)\cos(B) + \cos(A)\sin(B)$$

$$\cos(A+B) = \cos(A)\cos(B) - \sin(A)\sin(B)$$

$$\sin(2x) = 2\sin(x)\cos(x)$$

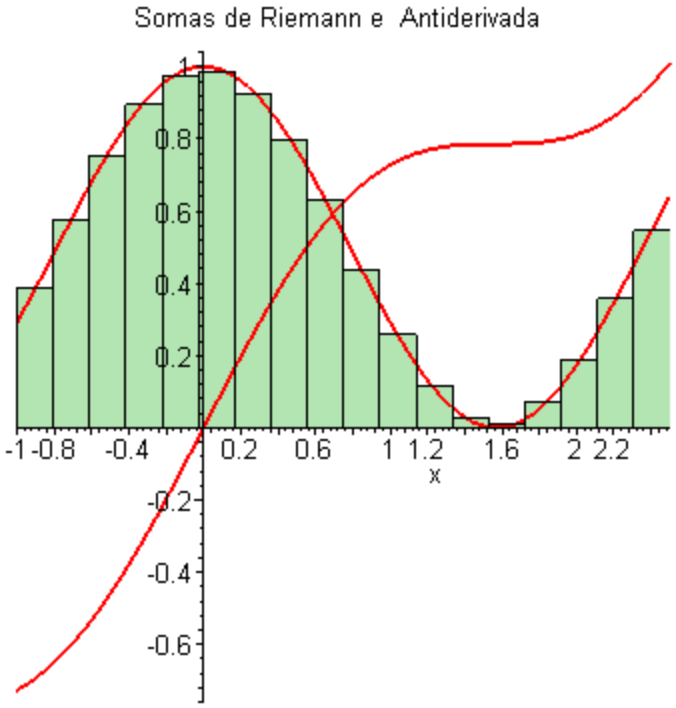
$$\cos(2x) = \cos(x)^2 - \sin(x)^2$$

$$\sin(x)^2 = -\frac{1}{2}\cos(2x) + \frac{1}{2}$$

$$\cos(x)^2 = \frac{1}{2}\cos(2x) + \frac{1}{2}$$

$$\int \cos(x)^2\,dx = \int \frac{1}{2}\cos(2x) + \frac{1}{2}\,dx$$

$$= \frac{1}{4}\sin(2x) + \frac{1}{2}x$$



Exemplos

```
> i6 := Int( sin(x)^2, x):
i7 := subs(eq7, i6): i6 = value(i7);
p9 := middlebox(sin(x)^2, x = -1 .. 5.5, 28):
p10 := plot( value(i6), x = -1 .. 5.5, thickness = 2 ):
p11 := plot(x/2, x = -1 .. 5.5, style=point):
plots[display]({p9, p10, p11}, scaling=constrained,
title=`Somas de Riemann e antiaderivada` );
```

$$\int \sin(x)^2\,dx = -\frac{1}{4}\sin(2x) + \frac{1}{2}x$$

Somas de Riemann e antiaderivada