# A table of derivatives and anti-derivatives

This example is based upon a nice example in the Pythontex gallery, see https://github.com/gpoore/pythontex/. It uses a tagged block to capture the Maple output for later use in the body of the LaTeX table.

```
# Create a list of functions to include in the table
funcs := [[sin(x),"\\\\"],         [cos(x),"\\\\"],         [tan(x),"\\\\"],
          [arcsin(x),"\\\\[5pt]"], [arccos(x),"\\\\[5pt]"], [arctan(x),"\\\\[5pt]"],
          [sinh(x),"\\\\"],        [cosh(x),"\\\\"],        [tanh(x)," "]]:

# mplBeg (CalculusTable)
for foo in funcs do
    func := foo[1]:
    eol  := foo[2]:
    myddx := ''diff''(func,x):
    myint := ''int''(func,x):
    Print(cat(Latex(myddx),"&=",Latex(diff(func,x)),"\\quad & \\quad")):
    Print(cat(Latex(myint),"&=",Latex(int(func,x)),eol)):
end do:
# mplEnd (CalculusTable)
```

```
\begin{align*}
   \mpl {CalculusTable}
\end{align*}
```

$$\frac{\mathrm{d}}{\mathrm{d}x}\sin(x) = \cos(x)$$
$$\frac{\mathrm{d}}{\mathrm{d}x}\cos(x) = -\sin(x)$$
$$\frac{\mathrm{d}}{\mathrm{d}x}\tan(x) = 1 + (\tan(x))^2$$
$$\frac{\mathrm{d}}{\mathrm{d}x}\arcsin(x) = \frac{1}{\sqrt{-x^2+1}}$$
$$\frac{\mathrm{d}}{\mathrm{d}x}\arccos(x) = -\frac{1}{\sqrt{-x^2+1}}$$
$$\frac{\mathrm{d}}{\mathrm{d}x}\arctan(x) = \left(x^2+1\right)^{-1}$$
$$\frac{\mathrm{d}}{\mathrm{d}x}\sinh(x) = \cosh(x)$$
$$\frac{\mathrm{d}}{\mathrm{d}x}\cosh(x) = \sinh(x)$$
$$\frac{\mathrm{d}}{\mathrm{d}x}\tanh(x) = 1 - (\tanh(x))^2$$

$$\int \sin(x)\ \mathrm{d}x = -\cos(x)$$
$$\int \cos(x)\ \mathrm{d}x = \sin(x)$$
$$\int \tan(x)\ \mathrm{d}x = -\ln(\cos(x))$$
$$\int \arcsin(x)\ \mathrm{d}x = x\arcsin(x) + \sqrt{-x^2+1}$$
$$\int \arccos(x)\ \mathrm{d}x = x\arccos(x) - \sqrt{-x^2+1}$$
$$\int \arctan(x)\ \mathrm{d}x = x\arctan(x) - \frac{1}{2}\ln\left(x^2+1\right)$$
$$\int \sinh(x)\ \mathrm{d}x = \cosh(x)$$
$$\int \cosh(x)\ \mathrm{d}x = \sinh(x)$$
$$\int \tanh(x)\ \mathrm{d}x = \ln(\cosh(x))$$