Solve an equation where the function involves an integral.
In this example, the solve key calls function f2, which in turn calls the integrate function.

Solve for x such that

$$f(x) = \int_0^x e^{\sin(t)+\tan(t)}\, dt = 0.7$$

Let function f1(t) be the function to be integrated, $e^{\sin(t)+\tan(t)}$.

f1: 1, sto, sin, 1 rcl, tan, +, e^x

Function f2(x) will be the integral of f1 from 0 to x, minus 0.7

f2: 0, x↔y, 1, $\int_a^b$, 0.7, −

Since each call to f2 involves doing an integral, function f2 will be slower to evaluate than a function that just does a simple formula. For this reason, we may want to do a few evaluations of f2 by hand first, so we can give the solve function a good starting point that is not far from the root.

0.2, enter, 2, f_n f2(0.2) = −0.45399345640598565593315462089 7

0.4, enter, 2, f_n f2(0.4) = −0.08497949541486371298162166673 5

0.6, enter, 2, f_n f2(0.6) = 0.47816991671207241189717469270 0

So we can use 0.4 as the starting point for the solv key to find a root of f2(x) = 0.

0.4, enter, 2, solv

This gives the value of x that makes the integral equal to 0.7.

0.43629599526882176401438649479 2

As a check, use this as an upper limit to integrate f1.

2, sto, 0, x↔y, 1, $\int_a^b$

This shows 0.70000000000000000000000000000 in the display.