Example: Standard Additions Method Development

The expected analyte concentration is fairly low, so it is best to avoid unnecessary sample dilution, if possible. We have 5mL of sample; with the proper cuvette, 1mL samples may be analyzed. So let's split the serum sample into 1mL portions, and let's spike three of them with added standard. To avoid diluting the sample matrix, we will make 10 microliter standard additions.

We shoudn't have any problems with linearity. Let's make the concentration of standard such that we approximately double the analyte concentration after our second addition.

$\mu g := 10^{-6} \cdot g$ $\mu L := 10^{-6} \cdot L$ $ppm := \frac{\mu g}{mL}$ [to allow MathCAD to do unit conversions]

(approximately)

amount of analyte in sample: $1 \cdot mL \cdot 0.1 \cdot ppm = 0.1 \cdot \mu g$

standard concentration: $\frac{0.1 \cdot \mu g}{20 \cdot \mu L} = 5.0 \cdot ppm$ concentration needed to double the amount of analyte in the sample after a 20 microlite spike.

So here is the procedure. **Obtain four 1mL samples of blood serum. Add 10, 20 and 30 microliter spikes of 5ppm to three of the serum samples, then perform the analysis.** Obviously, modifications could be made if needed as experience is gained in applying this procedure.