

(8.10) A sample counted for 15 min gave 9000 total counts. A 30 min background measurement registered 1200 counts. Calculate (a) the count rate for the sample alone, with its standard deviation, and (b) with its probable error.

General constants and definitions:

$$Bq := \text{sec}^{-1} \quad cps := \text{sec}^{-1}$$

Data given in the text are:

$$N := 9000 \quad \text{counts} \quad t := 15 \cdot 60 \cdot \text{sec} \quad N_0 := 1200 \quad \text{counts} \quad t_0 := 30 \cdot 60 \cdot \text{sec}$$

$$(a) \quad R := \frac{N}{t} \quad R_0 := \frac{N_0}{t_0} \quad R_{net} := R - R_0 \quad R_{net} = 9.33 \cdot cps$$

$$s := \frac{\sqrt{N}}{t} \quad s_0 := \frac{\sqrt{N_0}}{t_0} \quad s_{net} := \sqrt{s^2 + s_0^2} \quad s_{net} = 0.11 \cdot cps$$

$$(b) \quad Proberr := 0.67 \cdot s_{net} \quad Proberr = 0.072 \cdot cps$$