A random sample of 170 boys from 8502 boys in an area showed that 21 had some nutritional deficiency. Estimate the proportion of nutritionally deficient boys and the standard error of your estimate. Give the confidence interval also.

Solution

The proportion of nutritionally deficient boys is

$$\hat{p} = \frac{21}{170} = 0.1235.$$

The standard error of proportion is

$$SE = \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} = \sqrt{\frac{0.1235(1-0.1235)}{170}} = 0.0252.$$

A 95% confidence interval for the proportion of nutritionally deficient boys is

$$CI = (\hat{p} - z^*SE; \hat{p} + SE) = (0.1235 - 1.96 \cdot 0.0252; 0.1235 + 1.96 \cdot 0.0252) = (0.0741; 0.1729).$$