In a 2003 article, Hui and Bell (Health and Place. 9:371-376) reported that among 2,428 boys aged 7 to 12 years, 461 were overweight or obese.

Solution

    a. <u>On the basis of that study, can we conclude that more than 15 percent of the boys aged 7 to 12 in the sampled population are overweight?</u>
We can conclude that more than 15 percent of the boys aged 7 to 12 in the sampled population are overweight (the population proportion p is greater than 0.15), so the null hypothesis would be rejected for any reasonable significance level ($\alpha > p\ value = 1.8 \cdot 10^{-8}$).

    b. <u>What is the p-value?</u>

$$\hat{p} = \frac{461}{2428} = 0.1899.$$

The value of the test statistic is

$$z = \frac{0.1899 - 0.15}{\sqrt{\dfrac{0.15 \cdot 0.85}{2428}}} = 5.5061.$$

The p value of this test is

$$p\ value = P(Z > z) = P(Z > 5.5061) = 1.8 \cdot 10^{-8}.$$

    c. <u>What was the null hypothesis?</u>
The null hypothesis states that the population proportion of overweight or obese boys of ages 7 to 12 is ≤ 0.15,

$$H_0: p \leq 0.15.$$