

NAME SOLUTIONS

QUIZ 4
201-BZS-05
Probability & Statistics
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Date: April 24th 2009

Question 1 (1 mark) Define β in a hypothesis test.

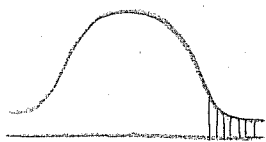
Question 2 (4 mark) The average IQ score in the Canadian population is 100. The director general at Dawson College claims that Dawson students have on average, a higher IQ than the average Canadian. A random sample of 50 Dawson students are sampled, their mean IQ was found to be 106. If the standard deviation of Canadian IQ scores is $\sigma = 3.5$, test the director general's claim about Dawson IQ scores at 5% significance.

Question 3 (5 mark) Suppose the actual Dawson student IQ score is 101. Find β for the above hypothesis test.

① β = probability of failing to reject a FALSE NULL hypothesis

② $H_0: \mu \leq 100$
 $H_a: \mu > 100$

since $n > 30$ &
 σ is known we can
use z-table



(Reject if $z > 1.645$)
 $z_{0.05} = 1.645$

TEST STATISTIC: $Z = \frac{106 - 100}{3.5/\sqrt{50}} = 12.12$

REJECT H_0

DAWSON IQ scores are higher than average
at 5% significance

③ $z = 1.645$ corresponds to what IQ value?

$$1.645 = \frac{\bar{x} - 100}{3.5/\sqrt{50}} \quad \bar{x} = 100.81$$

So we accepted H_0 for
All values $\bar{x} \leq 100.81$

$$P(\text{Accepting}) = P(\bar{x} \leq 100.81) = P\left(z \leq \frac{100.81 - 101}{3.5/\sqrt{50}}\right) = P(z \leq -0.38) = 0.5 - 0.1480 = 0.352$$