

THE UNIVERSITY OF SYDNEY
STAT2012 STATISTICAL TESTS

Semester 2	Tutorial Week 1	2015
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You need the statistical tables from the course website.

- Let $Z \sim \mathcal{N}(0, 1)$. Find
 - $P(-1.72 < Z < 0.52)$ and $P(|Z| > 1.96)$.
 - Find the values of a , b , and c such that $P(Z \leq a) = 0.7291$, $P(Z > b) = 0.10$ and $P(|Z| < c) = 0.90$.
- If $X \sim \mathcal{N}(10, 16)$, find $P(X > 12)$, $P(X \leq 7)$, and k such that $P(X \leq k) = 0.2$.
- X_1, X_2, \dots, X_{16} represents a random sample from a normal distribution with mean $\mu = 20$ and a standard deviation, $\sigma = 4$. Explain why the distribution of $\bar{X} - 20$ is standard normal. Hence find the probability, $P(\bar{X} \geq 22)$.
- Let X_1, X_2, \dots, X_{10} be a random sample of size 10 from an $\mathcal{N}(15, 2.53^2)$ distribution. Show that the probability, $P(\sum_{i=1}^{10} X_i \leq 158)$ is close to 0.8413.
- Find
 - $P(t_3 < 2.353)$ and $P(|t_{11}| > 2.718)$.
 - Find the values of a , b , and c such that $P(t_{20} \leq a) = 0.10$, $P(|t_{16}| > b) = 0.05$ and $P(t_{10} > c) = 0.90$.
- X_1, X_2, \dots, X_n (n is small) represents a random sample from a normal distribution with a known mean μ and unknown standard deviation σ . State the distribution of $T = \frac{\bar{X} - \mu}{S/\sqrt{n}}$ where S is the sample standard deviation.
- A random sample of size 25 from a normal population with mean, $\mu = 50$ is obtained. It gave the sample mean of 48 and the sample standard deviation of 4. Calculate a value of T , $T_{obs} = \frac{\bar{x} - \mu}{s/\sqrt{n}}$, as given in Q6. What is the df, ν associated with this t statistic? Find $P(t_\nu < T_{obs})$.