Module 18 self-assessment

Question 1

Use the t-distribution table from the EM2B exam appendix or the wikipedia page below to estimate the following values if T is a random variable drawn from a t-distribution with ν degrees of freedom.

`https://en.wikipedia.org/wiki/Student%27s_t-distribution`

(a) (i) $\mathbb{P}(T > 1.6)$ with $\nu = 3$. (ii) $\mathbb{P}(T < 1.6)$ with $\nu = 3$. (iii) $\mathbb{P}(-1.68 < T < 1.68)$ with $\nu = 29$. (iv) $\mathbb{P}(-1.6 < T < 1.6)$ with $\nu = 49$ (b) (i) The right critical value for probability $\alpha = 0.05$ when $\nu = 8$. (ii) The two-sided rejection region with probability $\alpha = 0.2$ for $\nu = 16$. (iii) Find the range for the middle 50% of probability with $\nu = 20$.

Question 2

Consider data $\{2.5, 7.3, 5.5, 8.5, 11.5, 9.7\}$ from a normal distribution whose mean μ and variance σ^2 are unknown. Construct the confidence intervals (i) 99%, (ii) 95% and (iii) 80% for μ.