



Equitable Equations: *Calculating in the t-distribution*

Include R code as appropriate.

Problem 1

Compute $P(T < -1.1)$ in $t(22)$. $p_t(-1.1, 22) = 14\%$

Problem 2

Compute $P(-1.5 < T < .4)$ in $t(5)$. $p_t(0.4, 5) - p_t(-1.5, 5) = 55\%$

Problem 3

Find the number τ such that $P(T > \tau) = .05$ in $t(80)$. Note that this is a right-tailed probability, not a left-tailed one.

$$q_t(1 - .05, 80) = 1.66$$

Problem 4

Find the number τ such that 95% of the area under $t(6)$ lies between $-\tau$ and τ . $q_t(.975, 6) = 2.45$

Problem 5

In a simple random sample of 10 sales clerks at convenience stores in 1989, the mean salary was \$25,352.87 and the standard deviation was \$3,202.09. Compute a level 95% confidence interval for the population mean. Carefully justify your answer.

$$\mu = 25,352.87 \pm t^* \frac{3202.09}{\sqrt{10}}$$

$$t^* = q_t(.975, 9)$$

$$\begin{aligned} \mu &= 25,352.87 \pm q_t(.975, 9) * (3202.09 / \sqrt{10}) \\ &= 25,352.87 \pm 2290.64 \end{aligned}$$