640:481 WS17 Austin DeCicco

1. $T = \frac{\bar{x}-\mu}{s/\sqrt{n}}$ $P(-t_{\alpha/2\,n-1} < T < t_{\alpha/2\,n-1}) = 1-\alpha$

Let $z = t_{\alpha/2\,n-1}$, then $P(-z < T < z) = 1-\alpha$

$P(-z < T < z) = P\left(-z < \frac{\bar{x}-\mu}{s/\sqrt{n}} < z\right) = P\left(-z\,s/\sqrt{n} < \bar{x}-\mu < z\,s/\sqrt{n}\right) =$

$P\left(-z\,s/\sqrt{n} - \bar{x} < -\mu < z\,s/\sqrt{n} - \bar{x}\right) = P\left(\bar{x} - z\,s/\sqrt{n} < \mu < \bar{x} + z\,s/\sqrt{n}\right) =$

$P\left(\bar{x} - t_{\alpha/2\,n-1}\,s/\sqrt{n} < \mu < \bar{x} + t_{\alpha/2\,n-1}\,s/\sqrt{n}\right) = 1-\alpha$ □