MS Module 4 *t* values and confidence intervals practice exam questions

(The attached PDF file has better formatting.)

A statistician estimates the population mean for a normal distribution from a sample of 6 points. The 99% confidence interval for the population mean is (0, 1.78)

Question 5.1: Critical *t* value

What is the critical *t* value for a 99% confidence interval from a sample of 6 points?

Answer 5.1: 4.032 (table look-up)

Question 5.2: Standard error of estimated mean

What is the standard deviation of the sample / the square root of the number of observations?

Answer 5.2: $(1.78 - 0) / (2 \times 4.032) = 0.2207$

(width of confidence interval = $2 \times t$ value $\times \sigma/\sqrt{N}$)

Question 5.3: Standard deviation of sample

What is the standard deviation of the sample?

Answer 5.3: $0.2207 \times 6^{0.5} = 0.5406$

(width of confidence interval = $2 \times t$ value $\times \sigma/\sqrt{N}$)

Question 5.4: Critical *t* value

What is the critical *t* value for a 95% confidence interval from a sample of 6 points?

Answer 5.4: 2.5706 (table look-up)

Question 5.5: Estimated mean

What is the estimated mean of the population?

Answer 5.5: $(1.78 - 0) / 2 = 0.89$

(mean = mid-point of confidence interval)

Question 5.6: Confidence interval

What is the 95% confidence interval for the population mean?

Answer 5.6: The confidence interval is $0.89 \pm 0.2207 \times 2.5706$:

! lower bound: $0.89 - 0.2207 \times 2.5706 = 0.323$
! upper bound: $0.89 + 0.2207 \times 2.5706 = 1.457$