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 4.1: Critical t value

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

Answer 4.1: 4.032 (table look-up)

Question 4.2: Standard error of estimated mean

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

Answer 4.2: (1.78 - 0) / (2 × 4.032) = 0.2207

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

Question 4.3: Standard deviation of sample

What is the standard deviation of the sample?

Answer 4.3:  $0.2207 \times 6^{0.5} = 0.5406$ 

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

Question 4.4: Critical t value

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

Answer 4.4: 2.5706 (table look-up)

Question 4.5: Estimated mean

What is the estimated mean of the population?

Answer 4.5: (1.78 - 0) / 2 = 0.89

(mean = mid-point of confidence interval)

Question 4.6: Confidence interval

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

Answer 4.6: The confidence interval is  $0.89 \pm 0.2207 \times 2.5706$ :

- lower bound: 0.89 0.2207 × 2.5706 = 0.323
- upper bound: 0.89 + 0.2207 × 2.5706 = 1.457