MS Module 20 Standardized residuals ratio two points practice exam questions

(The attached PDF file has better formatting.)

[The practice problems in the 24 modules explain the statistical procedures; the practice exam questions in this thread shows what you will be asked on the final exam.]

A regression model has the independent variable X values {1, 2, …, 7}.

- At the point x = 3, the residual is 0.16 and the standardized residual is 0.11
- The residual at the point x = 2 is -0.25

Question 20.1: $\overline{x}$

What is $\overline{x}$, the average X value?

Answer 20.1: (1 + 7) / 2 = 4

Question 20.2: S_{xx}

What is S_{xx}, the sum of squared residuals for the X values?

Answer 20.2: $(1 – 4)^2 + (2 – 4)^2 + (3 – 4)^2 + (4 – 4)^2 + (5 – 4)^2 + (6 – 4)^2 + (7 – 4)^2 = 28$

Question 20.3: Ratio of residual to standardized residual

What is the ratio of the residual to the standardized residual at the point x = 3?

Answer 20.3: 0.16 / 0.11 = 1.455

Question 20.4: Standardized residual factor

At the point x = 3, what is the value of $[(1 – 1/n – (x_i – \overline{x})^2 / S_{xx})]^{½}$?

Answer 20.4: $(1 – 1/7 – (3 – 4)^2 / 28)^{0.5} = 0.906$

Question 20.5: Least squares estimate for σ

What is *s*, the least squares estimate for σ?

Answer 20.5: 1.455 / 0.906 = 1.606

(the standardized residual = the residual / ($\sigma \times [(1 - 1/n - (x_i - \overline{x})^2 / S_{xx})]^{½}$))

Question 20.6: Standardized residual

What is the standardized residual at the point x = 2?

Answer 20.6: $-0.25 / (1.606 \times (1 – 1 / 7 – (2 – 4)^2 / 28)^{0.5}) = -0.184$

(the standardized residual = the residual / ($\sigma \times [(1 - 1/n - (x_i - \overline{x})^2 / S_{xx})]^{½}$))