Inference for Regression

Fatigue, especially those induced by sleep deprivation, leads to cognitive deficits. You will complete a certain cognitive test called Psychomotor Vigilance Test (PVT) that show reaction times. Please complete the test for the complete 2 minutes, and record your average response time.
http://www.sleepdisordersflorida.com/pvt1.html

1. A simple random sample of Gunn students (this class) will be taking a timed reaction test online, and also reporting the numbers of hours of sleep they got last night. We want to see if there is evidence at the 5% significance level to suggest that timed average reaction test scores increase with more sleep.

Student	Hours of sleep	Score		Student	Hours of sleep	Score		Student	Hours of sleep	Score
1				11				21		
2				12				22		
3				13				23		
4				14				24		
5				15				25		
6				16				26		
7				17				27		
8				18				28		
9				19				29		
10				20				30		

2. Create a scatterplot and find the equation for the least squares regression line. Interpret the slope of the least squares regression line in the context of hours of sleep and test scores.

3. What is the value of r? Explain what this value indicates.

4. The standard error about the line is found by $s = \sqrt{\frac{1}{n-2}\sum(residuals)^2}$. Verify the value of s, and explain what s measures? ***Hint: use your lists to help with the calculations!***

5. The standard error of our slope, b is denoted as SE_b. What do you believe SE_b measures and how do you think it is calculated? Show work below.

   Want a hint? Raise your hand…

6. Is a linear model a good model for predicting test scores based on hours of sleep the night before? Explain what you would information you would use to justify your conclusion.

In your groups:

a. What does the equation $\mu_y = \alpha + \beta x$ represent? Explain what each of the variables represent.
b. What do you think our significance test will test for?
c. Do you believe that the LSRL we found in #2 is a statistic or parameter? Explain.

d. What does it mean to conduct a hypothesis test of $H_o : \beta = 0$ vs. $H_o : \beta \neq 0$ (or $\beta > 0$ or $\beta < 0$)?

7. Is there evidence at the 5% significance level to suggest that tests scores increase with more sleep?