Conduct of Inquiry Homework

Instructions and Information: Answer each question in a new document, and show your work where applicable. Present exercises in numerical order, and label your answers clearly.

For questions 1-6, consider the following regression equation:

$$\hat{y}_i = 2.0 + 0.5x_{1i} + 0.2x_{2i}$$

1. Imagine y is employee productivity, x_1 is employment experience in years, and x_2 is a continuously measured employee efficiency rating. Jim has just been hired today, and his efficiency rating is 80. What level of productivity would you expect from Jim, all else being equal?

(a) 2
(b) 18
(c) 42
(d) 58

2. How much is Jim's productivity expected to improve after he gains an additional 6 years of experience, all else being equal?

(a) 1.2 units
(b) 3.0 units
(c) 16.0 units
(d) 21.0 units

3. What is the best interpretation of the intercept term (2.0) in the regression equation?

(a) This is the expected gain in productivity for each additional year of experience.
(b) This is the expected gain in productivity for a unit increase in efficiency.
(c) This is the expected productivity level for all new hires.

(d) This is the expected productivity level for new hires with an efficiency rating of 0.

4. Jack has 3 years more experience than Jill, but Jill's efficiency score is 20 points higher than Jack's. All else being equal, who is expected to be more productive?

(a) Jack is expected to be more productive than Jill.
(b) Jill is expected to be more productive than Jack.
(c) Jack and Jill are expected to have about equal productivity.
(d) None of the above.

5. Which variable(s) in the regression are your independent variables?

(a) y_i
(b) x_{1i}
(c) x_{2i}
(d) both x_{1i} and x_{2i}

6. Given that y is employee productivity, x_1 is employment experience in years, and x_2 is a measure of an employee's efficiency rating, what is the null relationship between productivity and experience? What is the alternative relationship between productivity and experience? (the null and alternative hypotheses)