

(b)

Always choose the closest answer.

1 - 4 A researcher has specified the model
response to med = $y = b_0 + b_1 x_1 + b_2 x_2 + \text{error}$
 $x_1 = \text{sensitivity to trial dose}$
 $x_2 = \text{body weight}$

100 subjects are each measured for y, x_1, x_2 . The resulting data give

$$R = 0.8 \quad s_y = 0.36 \quad \hat{b}_0 = 0.3 \quad \hat{b}_1 = 0.6 \quad \hat{b}_2 = -0.2$$

1. The fraction of s_y^2 explained by regression.

- a) .67 b) .79 c) .87 d) .93 e) .98

$$R^2 = .8^2 = .64$$

2. The regression prediction \hat{y} for the response of a subject having sensitivity 0.7 and weighing 1.78.

- a) 0.37 b) 0.47 c) 0.57 d) 0.67 e) 0.77

$$\hat{b}_0 + \hat{b}_1 x_1 + \hat{b}_2 x_2 \\ (.3) + (.6) \cdot 0.7 + (-.2) \cdot 1.78 = .364$$

3. Suppose the plot is **elliptical**. For the group of all subjects having sensitivity 0.7 and weighing 1.78 what is the mean of y-scores?

- a) 0.27 b) 0.37 c) 0.47 d) 0.57 e) 0.67

SAME AS #2. .364

4. Suppose the plot is **elliptical**. For all subjects having sensitivity 0.7 and weighing 1.78 what is the standard deviation of y-scores?

- a) 0.05 b) 0.15 c) 0.20 d) 0.25 e) 0.3

$$\sqrt{1 - R^2} s_y = \sqrt{1 - .8^2} \cdot .36 \\ = .216$$

5. Give the estimated margin of error for \bar{y} assuming the sample is random and the FPC is near one.

- a) 0.03 b) 0.08 c) 0.11 d) 0.18 e) 0.26

$$1.96 \frac{s_y}{\sqrt{n}} = 1.96 \frac{.36}{\sqrt{100}} = .070$$

6. Range of R. a) [0, 1] b) [-.5, .5] c) [-.25, .25] d) [-1, 1]

7. Casting straight line regression as MLR, what is the matrix of inputs for a straight line regression with (x, y) data points (1, 5), (2, 2), (3, 1)?

- a) $\{\{1, 2, 3\}, \{5, 2, 1\}\}$ b) $\{\{1, 1, 5\}, \{1, 2, 2\}, \{1, 3, 1\}\}$
c) $\{\{1, 1\}, \{1, 2\}, \{1, 3\}\}$ d) $\{5, 2, 1\}$

$$x = 1, 2, 3$$

$$myx = \begin{bmatrix} 1 & 1 \\ 1 & 2 \\ 1 & 3 \end{bmatrix}$$