PSYCHOLOGY 300A (F01)

Examination 2 Answers
November 3, 2016

1. **.3** (1 pt) [50 scores in the distribution; 11 scores are ≤ 5 and 4 scores are ≥ 12; (11+4)/50 = .30]

2. **.11** (3 pts) [z = (27 – 20)/4 = 1.75; p(X ≥ 27) = area in smaller portion for z of 1.75 = .0401; p(X < 27) = 1 -.0401 = .9599; the score of 27 or greater can be drawn as the first one sampled, the second one, or the third one, so there are three sequences that will yield the outcome of interest (i.e., one score of 27 or greater, and two scores less than 27); each sequence has a probability of (.0401)(.9599)(.9599) = .0369; so the probability of getting any one of those three sequences is (3)(.0369) = .1107]

3. (a) **2 and 3** (1 pt)
   (b) One point should be close to the intersection of the dotted lines (M_X,M_Y), and one should be further away; the points can be in either quadrant 2 or 3 (2 pts)

4. The overall correlation will be negative. (1 pt)

5. Yes (1 pt) [subjects were randomly assigned to deprivation levels so other factors could not have caused the relationship]

6. The mean of the bivariate distribution of X and Y (μ_X, μ_Y) (2 pts)
7. (a) \(2.67\) (2 pts) \([\text{cov}_{XY} = 8/3 = 2.67]\)
(b) \(0.58\) (1 pt) \([r = 2.67/((3.27)(1.41)) = 0.58]\)

8. **intercept = 7** (1 pt) **slope = -0.5** (1 pt)
   [the line intercepts the Y axis at 7; the height of the line drops by 1 unit for every increase of 2 units on X, so the slope is -1/2]

9. **False** (2 pts) [The slope of the line in the raw data can be any positive, non-zero value, depending on the relative size of \(s_X\) and \(s_Y\), as per the formula for the best fitting line; when a scatter plot of z scores is considered, the slope will always be 1 whenever \(r = 1\).]

10. (a) \(b = -1.12\) (1 pt) \(a = 118.96\) (1 pt) \([b = -0.70(8/5) = -1.12; a = 87.6-(-1.12)28.0 = 118.96]\)
(b) \(5.79\) (1 pt) \([s_{Y-\hat{Y}} = 8\sqrt[1-(-0.70)^2](39/38) = 5.79]\)
(c) \(0.38\) (1 pt) \([z = (90-87.6)/8 = 0.30; \text{area in smaller portion} = .3821]\)
(d) \(21\) (2 pts) \([\hat{Y} = 118.96 + (-1.12)30 = 85.36; z = (90-85.36)/5.79 = 0.80; \text{area in smaller portion} = .2119]\)

12. (3 pts -- 1pt for each line)

   ![Diagram](image)

   [(a) The standard error of estimate is based on deviations between each observed \(Y\) and the corresponding predicted \(Y\) (which lies on the regression line). (b) The sum of squares of predicted \(Y\) values is based on deviations between predicted \(Y\) values (which lie on the regression line) and the mean of the raw \(Y\) scores. (c) The standard deviation of raw \(Y\) scores is based on deviations between raw \(Y\) scores and the mean of the raw \(Y\) scores.]