

STAT100 Elementary Statistics and Probability Summer II 2014

Quiz 2, Friday, July 18, 2014

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Show all work clearly and in order, and circle your final answers. Justify your answers algebraically whenever possible. You are allowed to calculator for basic calculation in this quiz. You have 15 minutes to take this 10 point quiz.

1. (5 points) Use linear regression to predict the value of y when $x = 10$. Check the correlation coefficient to make sure the linear prediction is appropriate.

x	y	$x - \bar{x}$	$y - \bar{y}$	$(x - \bar{x})^2$	$(y - \bar{y})^2$	$(x - \bar{x})(y - \bar{y})$
0	12	-4	5	16	25	-20
2	9	-2	2	4	4	-4
5	6	1	-1	1	1	-1
6	5	2	-2	4	4	-4
7	3	3	-4	9	16	-12
20	35	0	0	34	50	-41
$\bar{x} = \frac{20}{5} = 4$	$\bar{y} = \frac{35}{5} = 7$			S_{xx}''	S_{yy}''	S_{xy}''

$$r = \frac{S_{xy}}{\sqrt{S_{xx} S_{yy}}} \approx -.994$$

$|r|$ close to 1 \Rightarrow strong linear relation.

$$\hat{\beta}_1 = \frac{S_{xy}}{S_{xx}} \approx -1.206$$

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x} \approx 11.824$$

The fitted line:

$$\hat{y} = 11.824 - 1.206x$$

Plug in $x = 10$

$$\hat{y} = \boxed{-0.236}$$

2. (5 points) Given the following event probabilities

$$P(\bar{A}) = 0.55, \quad P(B) = 0.6, \quad P(A \cup B) = 0.64.$$

Determine:

a). $P(A)$.

$$P(A) = 1 - P(\bar{A}) = \boxed{.45}$$

b). $P(AB)$.

$$P(AB) = P(A) + P(B) - P(A \cup B) = .45 + .6 - .64 = \boxed{.41}$$

c). $P(\bar{A} \cup \bar{B})$.

$$P(\bar{A} \cup \bar{B}) = P(\overline{AB}) = 1 - P(AB) = \boxed{.59}$$

Venn Diagram

