

## ECN 102, Spring 2020

### Week 7 Section Regression Calculations

## Question 1

$$\sum_{i=1}^{10} (x_i - \bar{x})^2 = 10$$

$$\sum_{i=1}^{10} (y_i - \bar{y})^2 = 90$$

$$\sum_{i=1}^{10} (x_i - \bar{x})(y_i - \bar{y}) = 20$$

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$$\bar{x} = 1$$

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Calculate the OLS intercept and slope coefficients.

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$$b_2 = \frac{\sum_{i=1}^n (x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^n (x_i - \bar{x})^2}$$

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$$b_1 = \bar{y} - b_2 \bar{x}$$

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$$b_1 = \bar{y} - b_2 \bar{x} = 20 - 2(1) = 18$$

## Question 2

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Calculate the standard error of the regression.

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$$s_e = \sqrt{\frac{\text{RSS}}{n - 2}}$$



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Calculate the standard error of the regression.

$$s_e = \sqrt{\frac{\text{RSS}}{n-2}} = \sqrt{\frac{50}{8}} = 2.5$$

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$$R^2 \equiv \frac{\text{ESS}}{\text{TSS}}$$

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$$R^2 = 1 - \frac{RSS}{TSS}$$

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$$R^2 = 1 - \frac{RSS}{TSS} = 1 - \frac{50}{90} = 0.4444$$

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Calculate the correlation coefficient  $r_{xy}$ .

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Third sum is positive, which implies that covariance is positive, which implies correlation is positive. So  $r_{xy} = 0.6666$ .