

- Exercise 50 (a) and (b) page 537
- Given the five pairs of  $(x, y)$  values

$x$	1	3	5	7	9
$y$	3	2	5	7	8

- Calculate the least squares estimates  $\hat{\beta}_0$  and  $\hat{\beta}_1$ .
  - Determine the least squares line.
  - In addition to estimation errors caused by sampling variation, what added danger is there in estimating the mean value of the response when  $x = 20$ ?
- Consider the regression model

$$Y = \beta_0 + \beta_1 x + \epsilon$$

where  $\beta_0 = -1$  and  $\beta_1 = -2$  and the normal random variable  $\epsilon$  has mean 0 and variance 2.

- What is the mean of the response  $Y$  when  $x = 4$  ?
  - Will the response at  $x = 2$  always be larger than the response at  $x = 4$ ? Explain.
- Let  $X$  and  $Y$  have joint probability density function
 
$$\frac{1}{\pi\sqrt{48}}e^{-\frac{1}{6}(x^2 - xy + y^2)}$$
    - Identify the parameters  $\mu_1, \sigma_1^2, \mu_2, \sigma_2^2$  and  $\rho$  in this bivariate normal distribution.
    - Specify the conditional distribution of  $Y$  given  $X = x$ . Also specify the regression of  $Y$  on  $x$ . ( this is the conditional expectation  $E[Y | X = x]$ )
  - Exercise 59 (a), (b), and (c) page 547