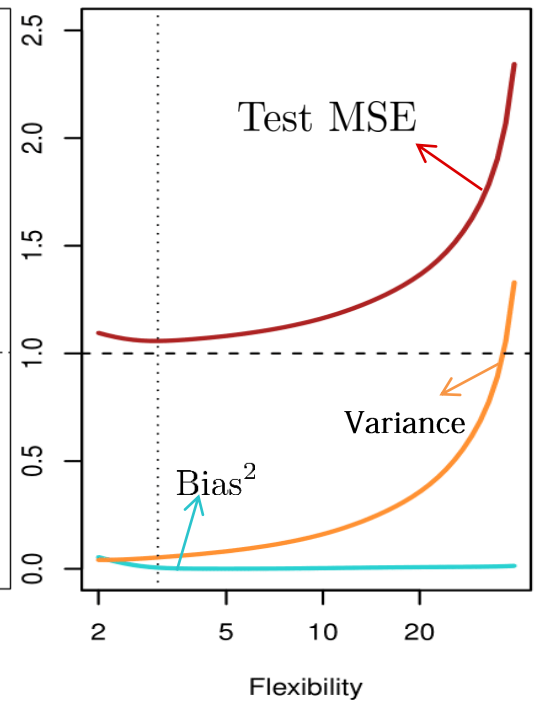
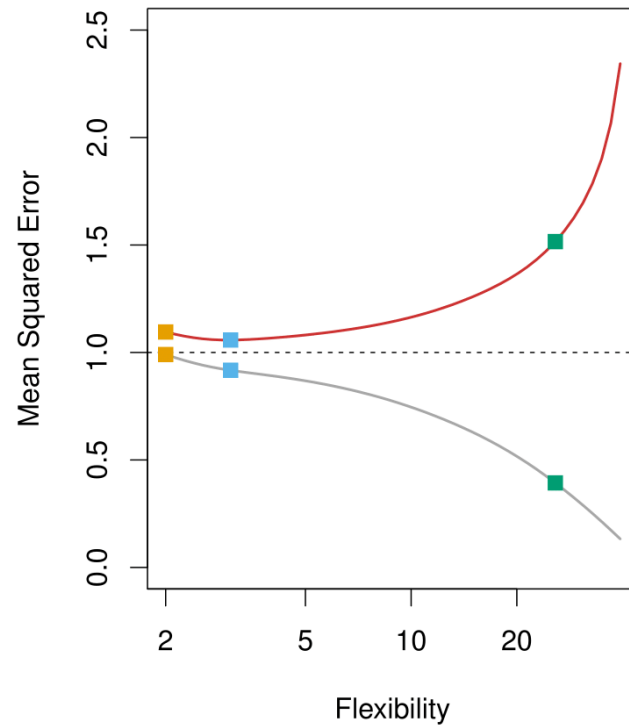
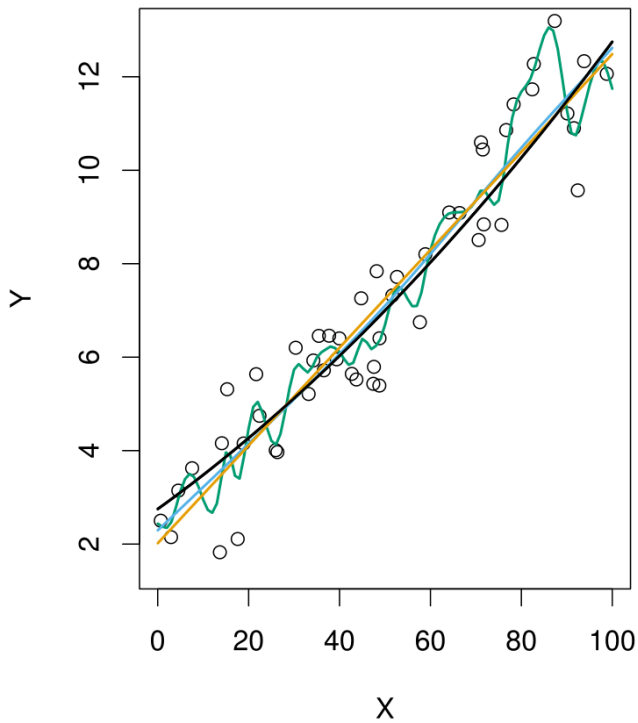


$$E \left(Y - \hat{f}(X) \right)^2 = \underbrace{\text{Var} \left(\hat{f}(X) \right)}_{\text{Variance}} + \underbrace{\left[E \left(\hat{f}(X) \right) - f(X) \right]^2}_{\text{Bias}^2} + \underbrace{\text{Var}(\epsilon)}_{\text{Irreducible error}}$$

Test MSE
Variance
Bias²
Irreducible error

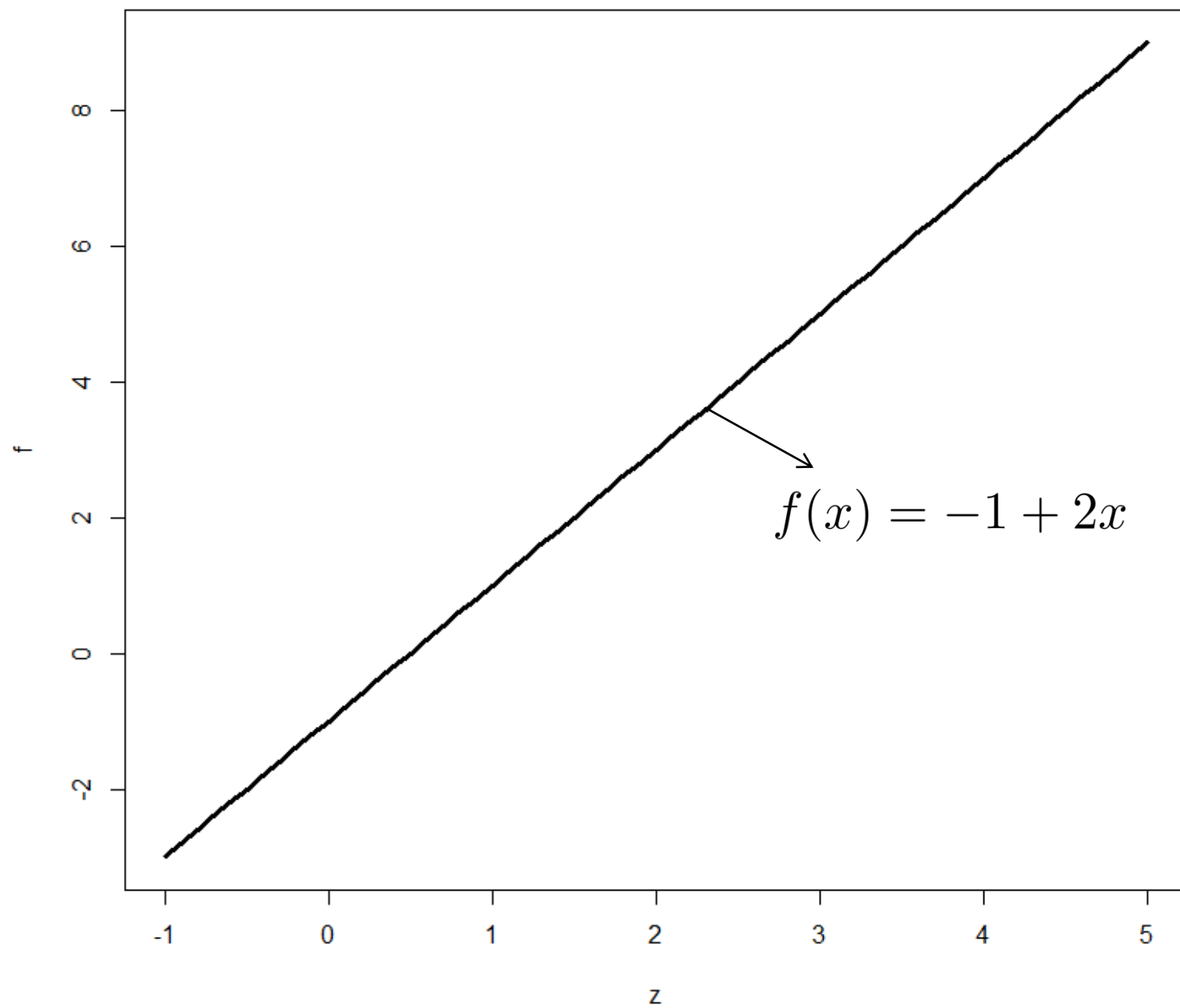


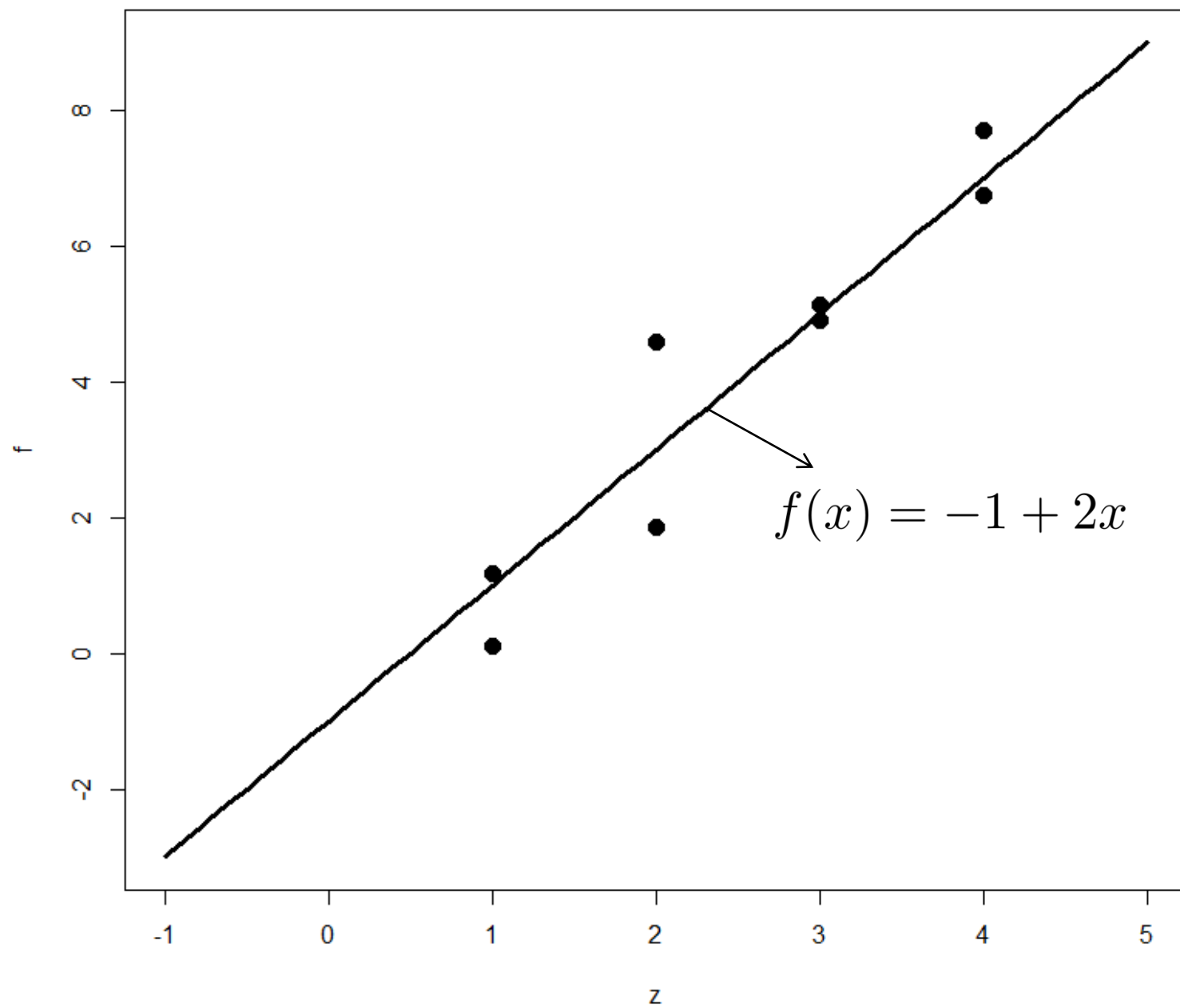
단순회귀의 Unbiasedness를
눈으로 직접 확인해보자!!

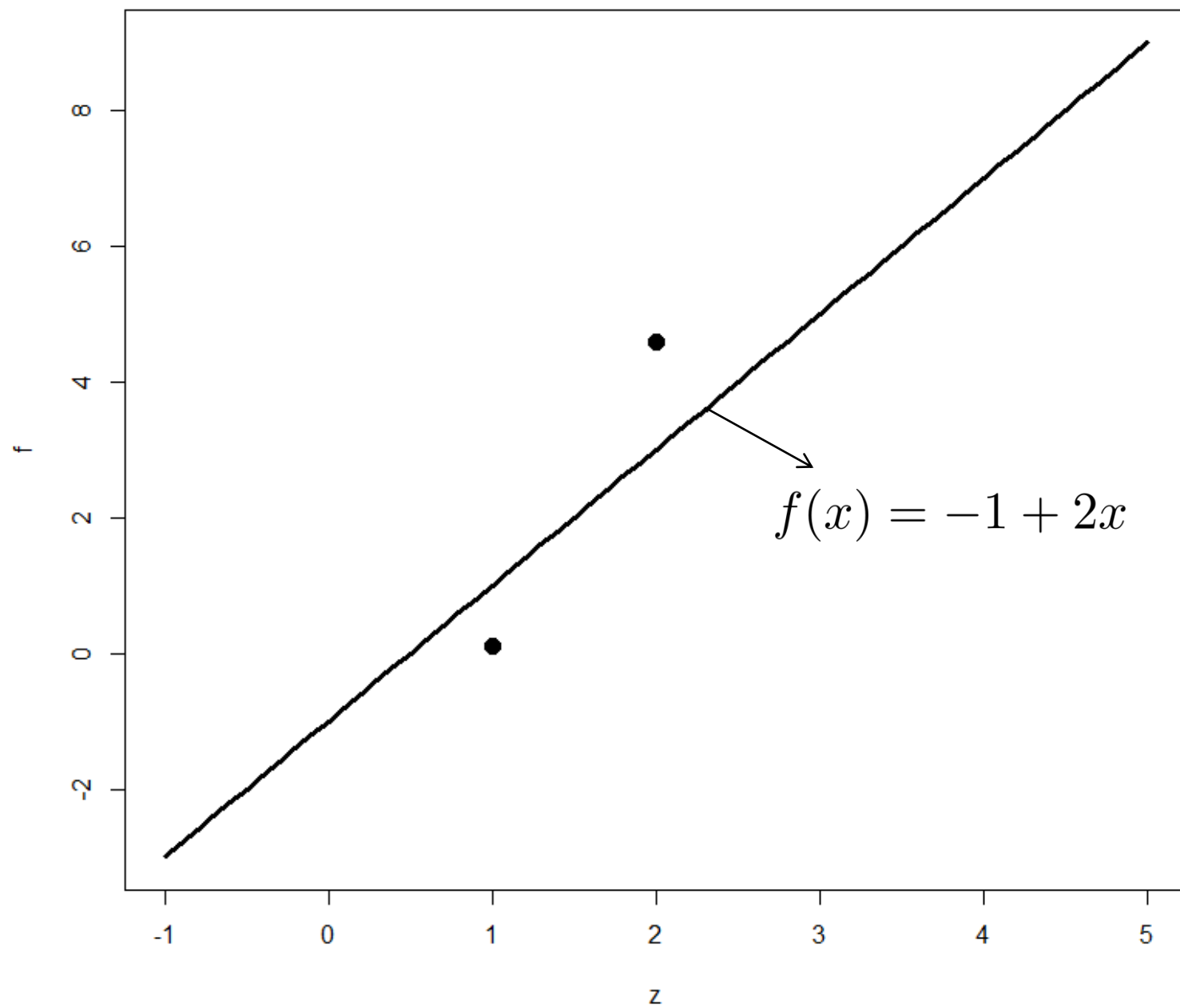
회귀분석의 기본 가정

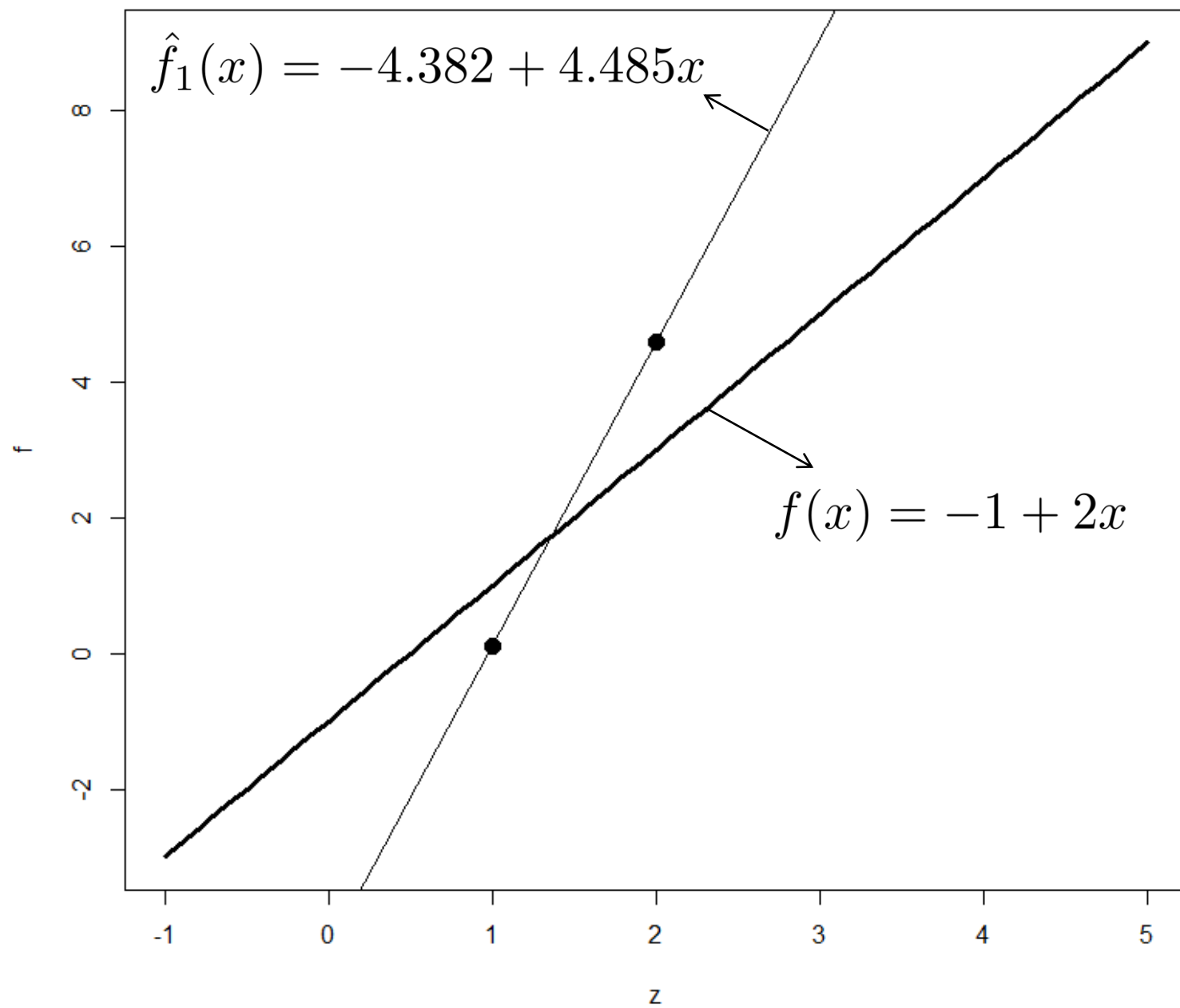
$$Y_i = \beta_0 + \beta_1 x_i + \epsilon_i, \quad i = 1, 2, \dots, n$$

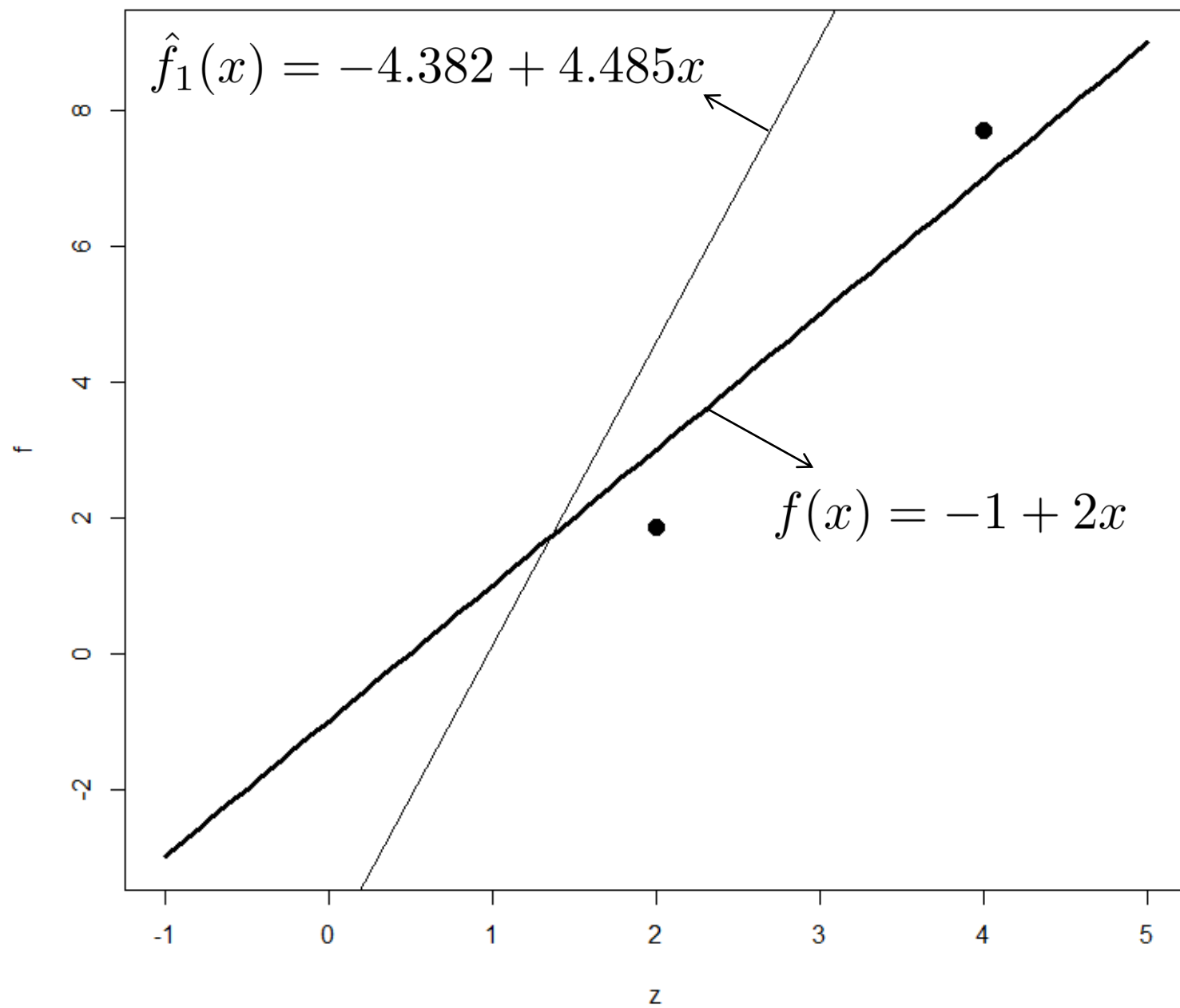
1. 오차항의 평균은 0이고 분산은 σ^2 이다.
즉, $E(\epsilon_i) = 0, \quad Var(\epsilon_i) = \sigma^2$
2. 오차항들은 서로 독립이다.
3. 오차항은 정규분포를 따른다: $\epsilon_i \sim N(0, \sigma^2)$

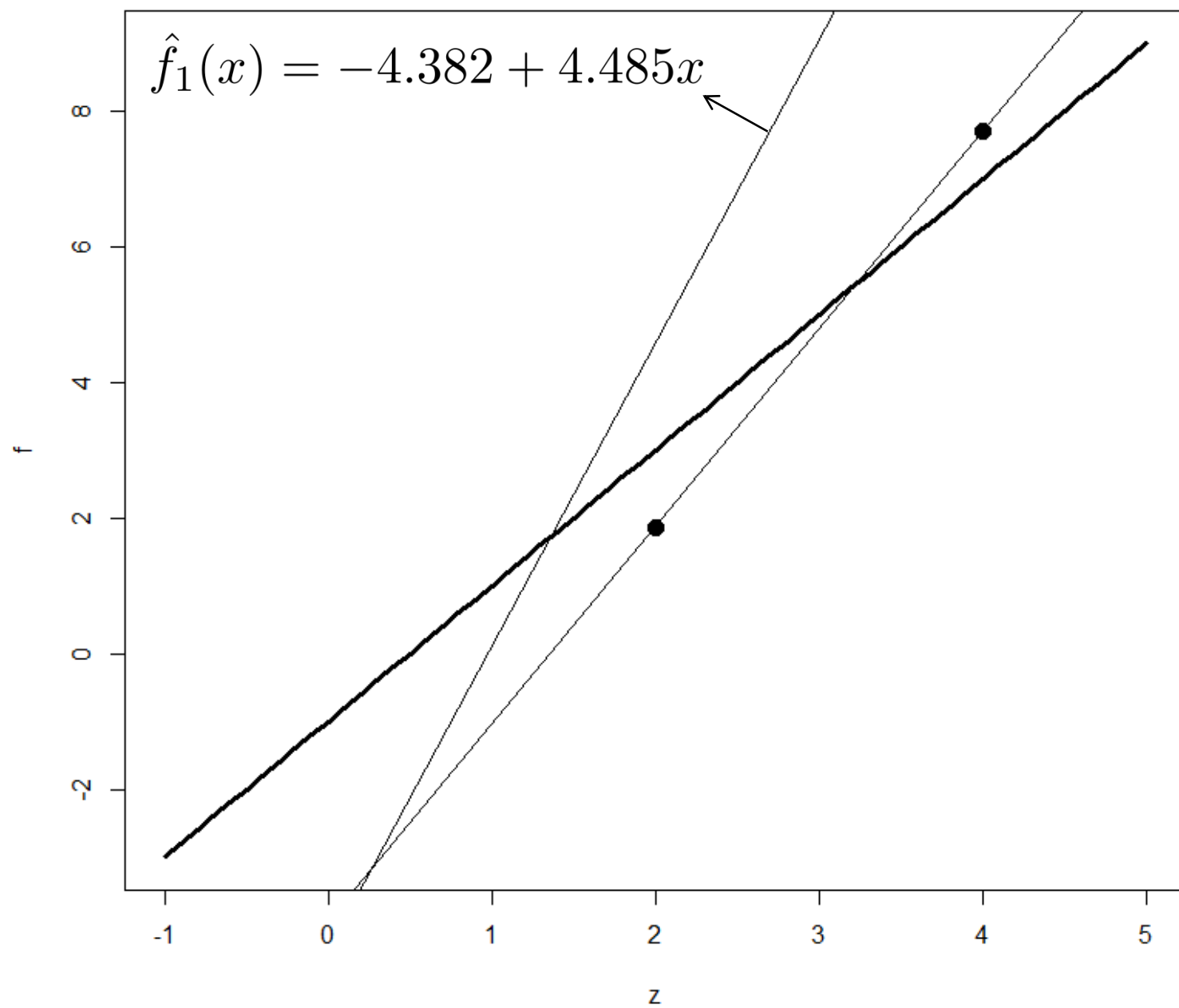


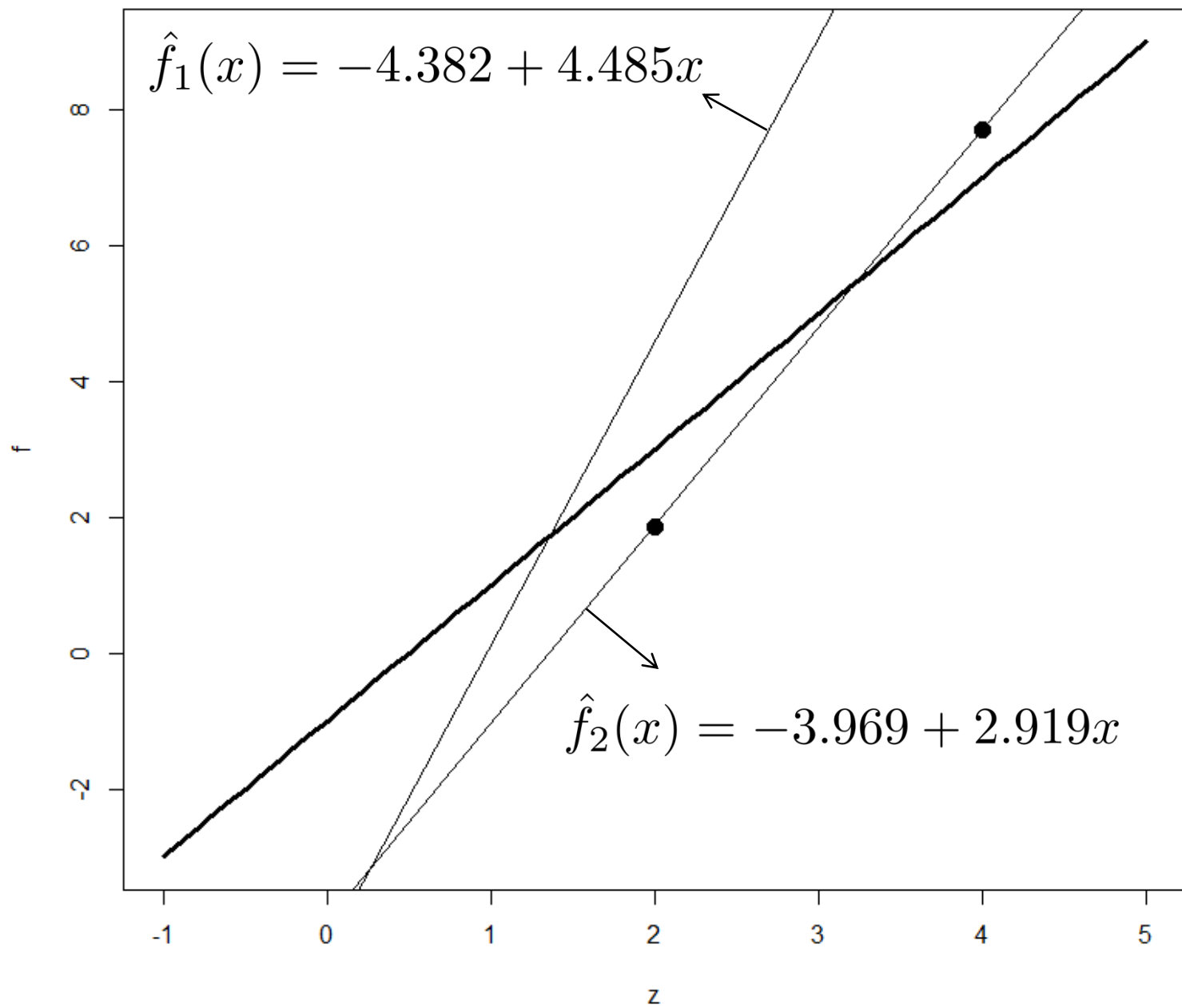






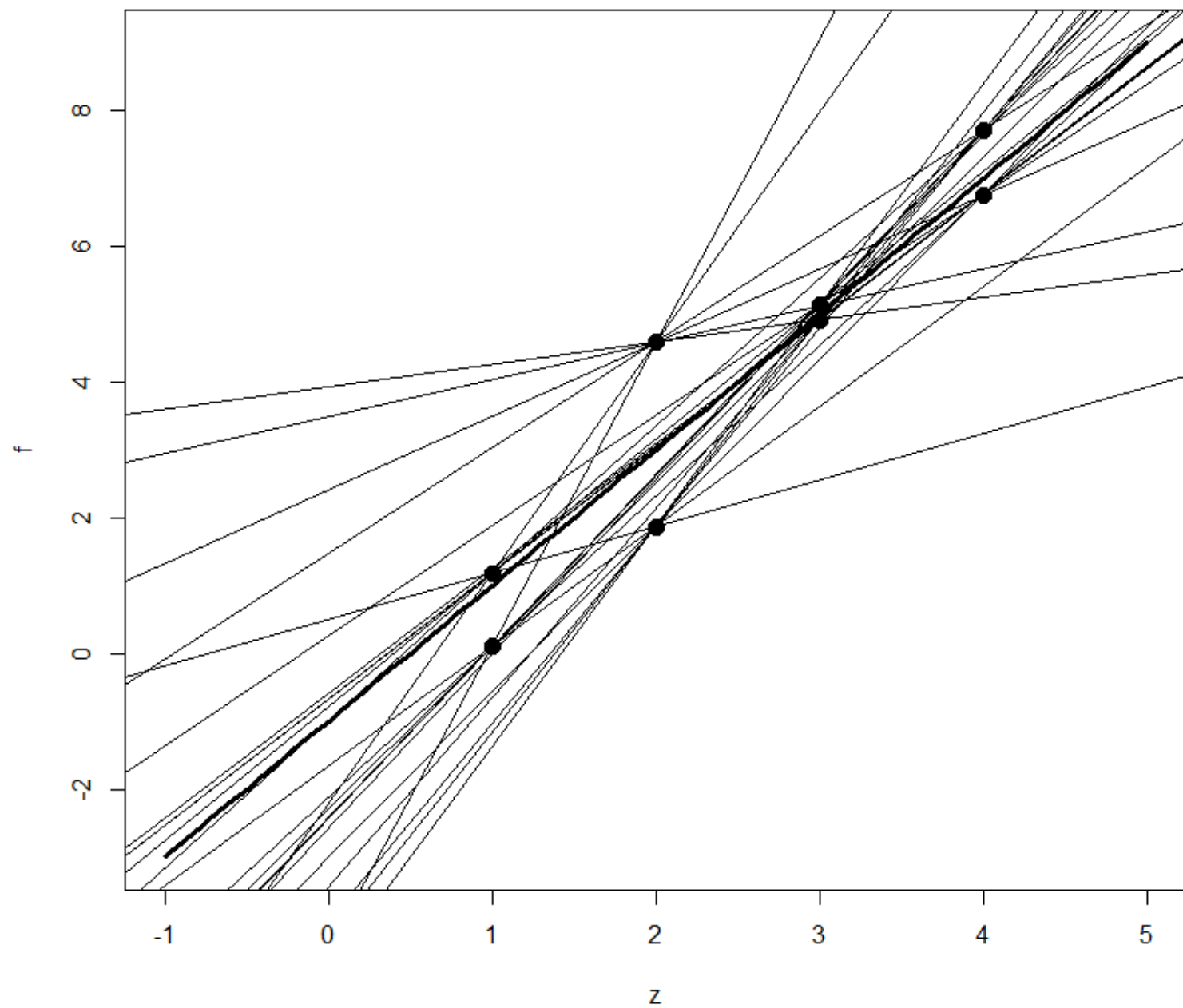


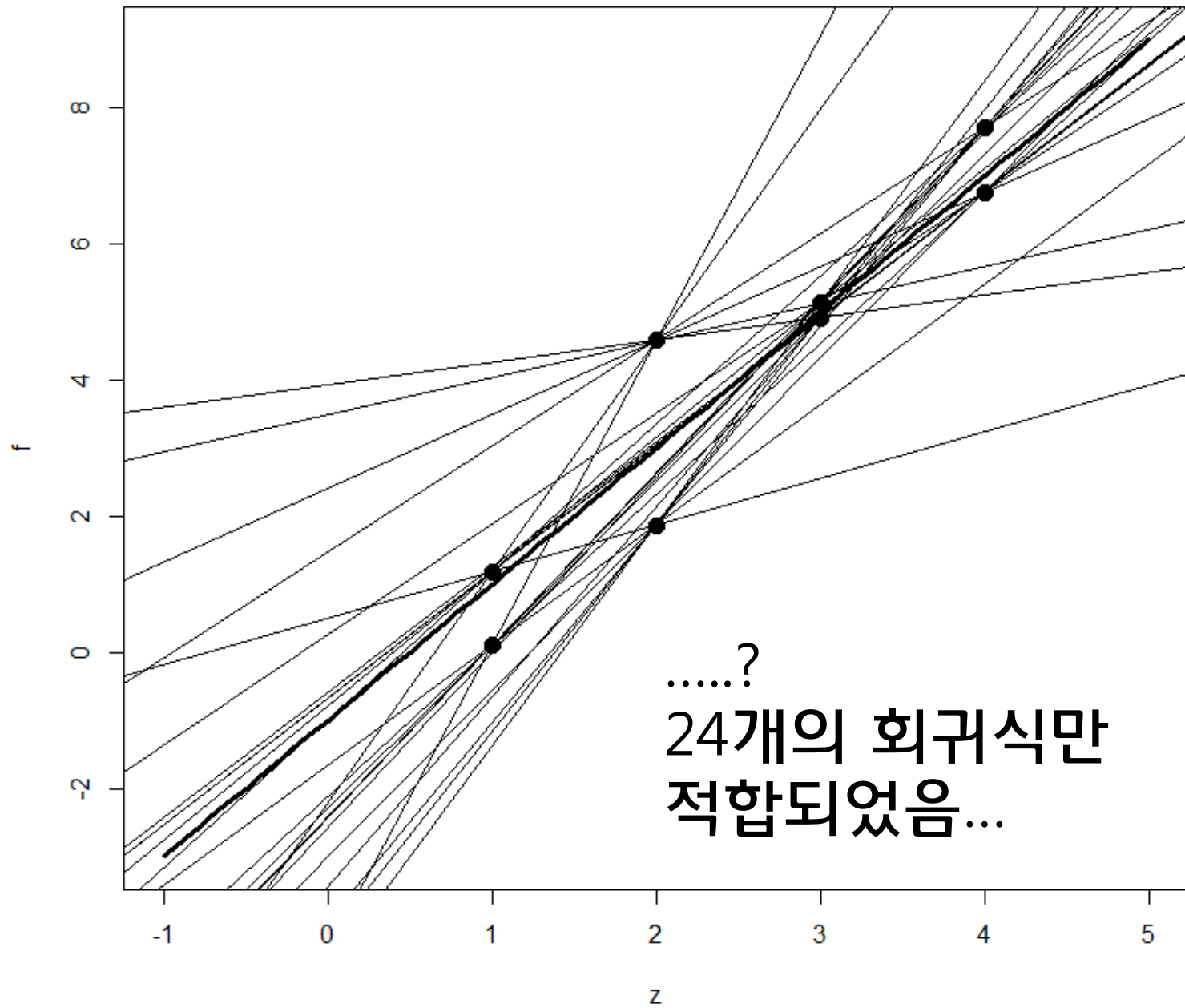




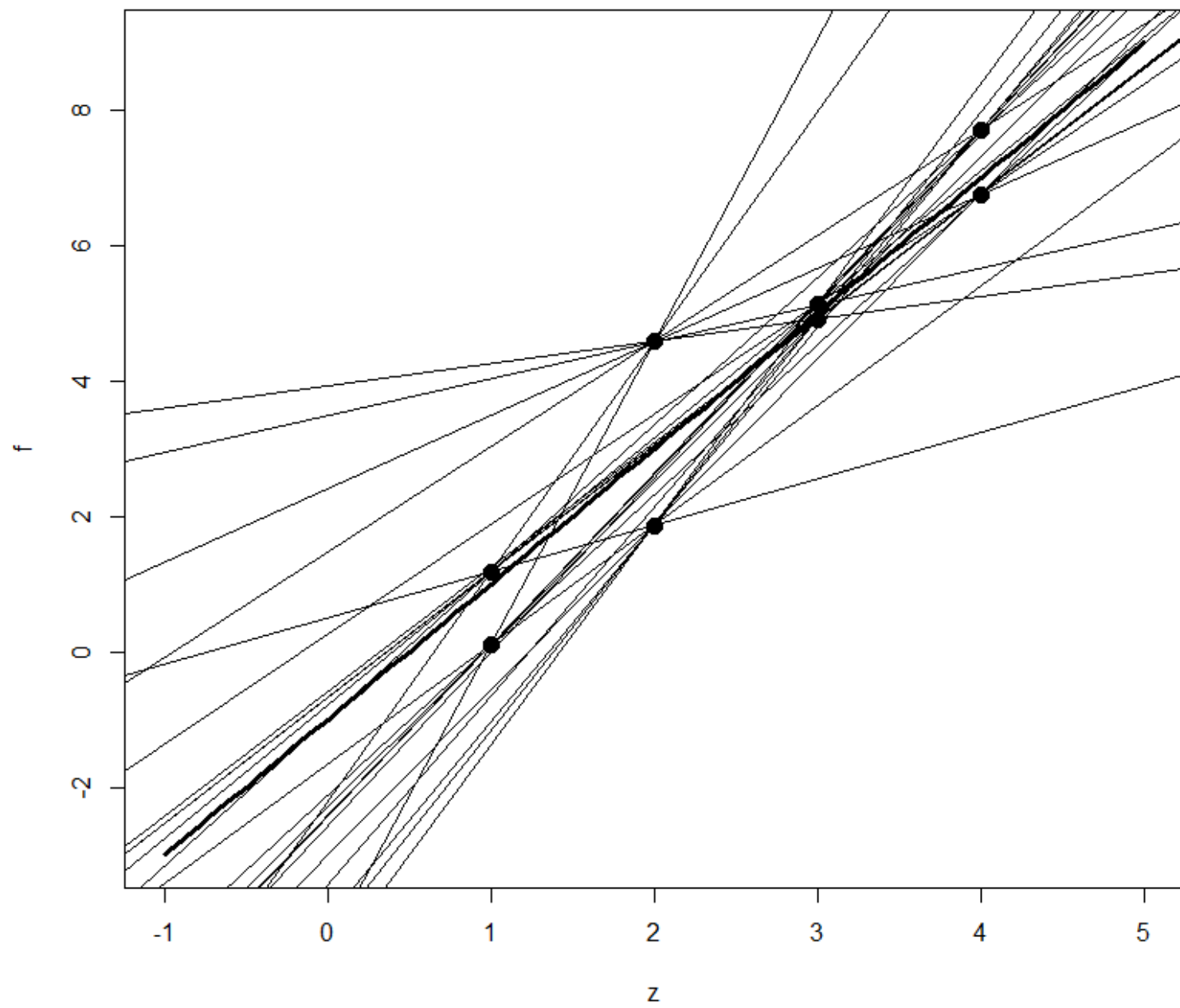
$8C2 = 28$ 개의 모든 가능한 회귀직선을 적합하여
평균내면 되겠구나!

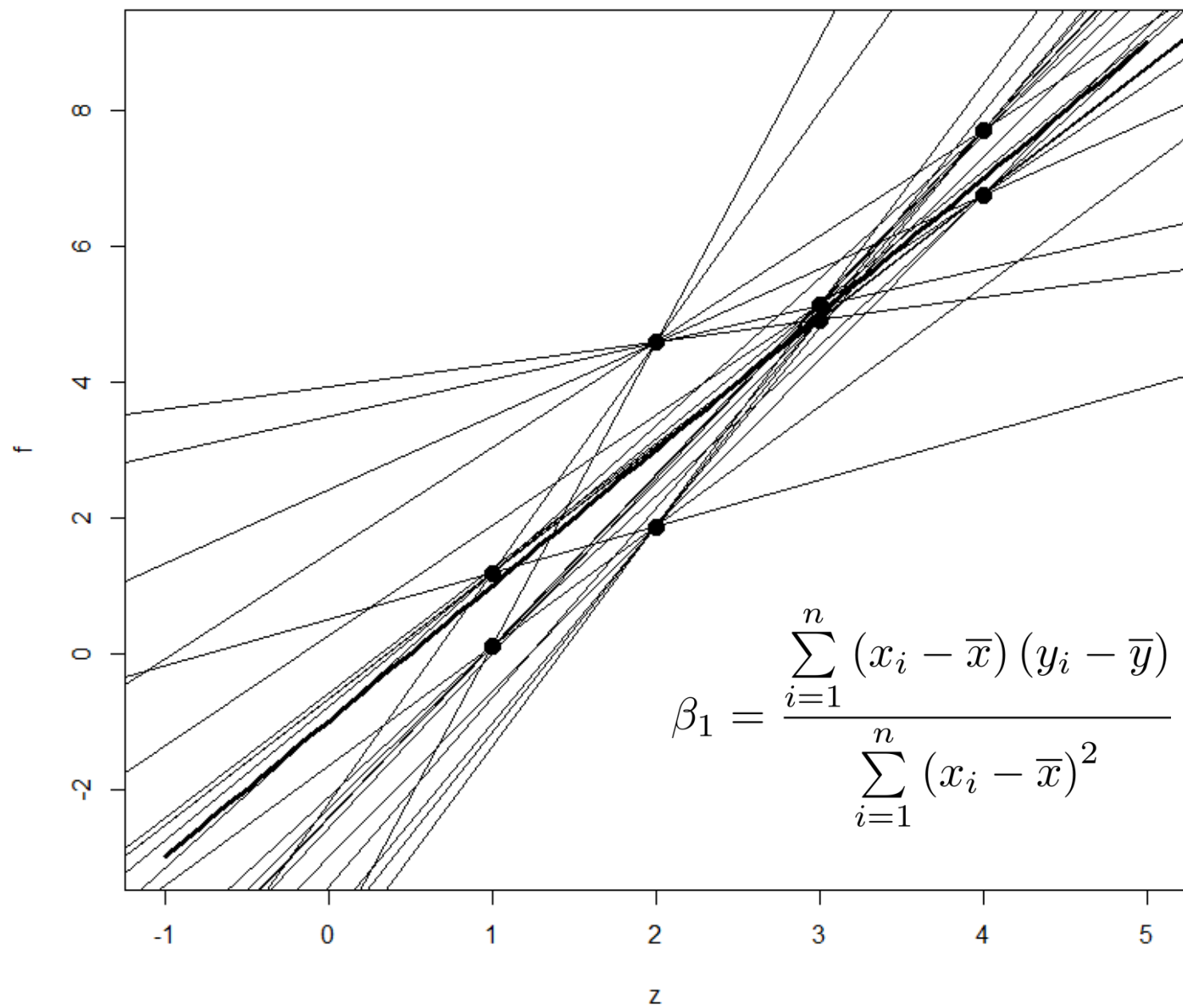
$$\frac{\hat{f}_1(x) + \hat{f}_2(x) + \cdots + \hat{f}_{28}(x)}{28} = -1 + 2x$$
$$= f(x)$$

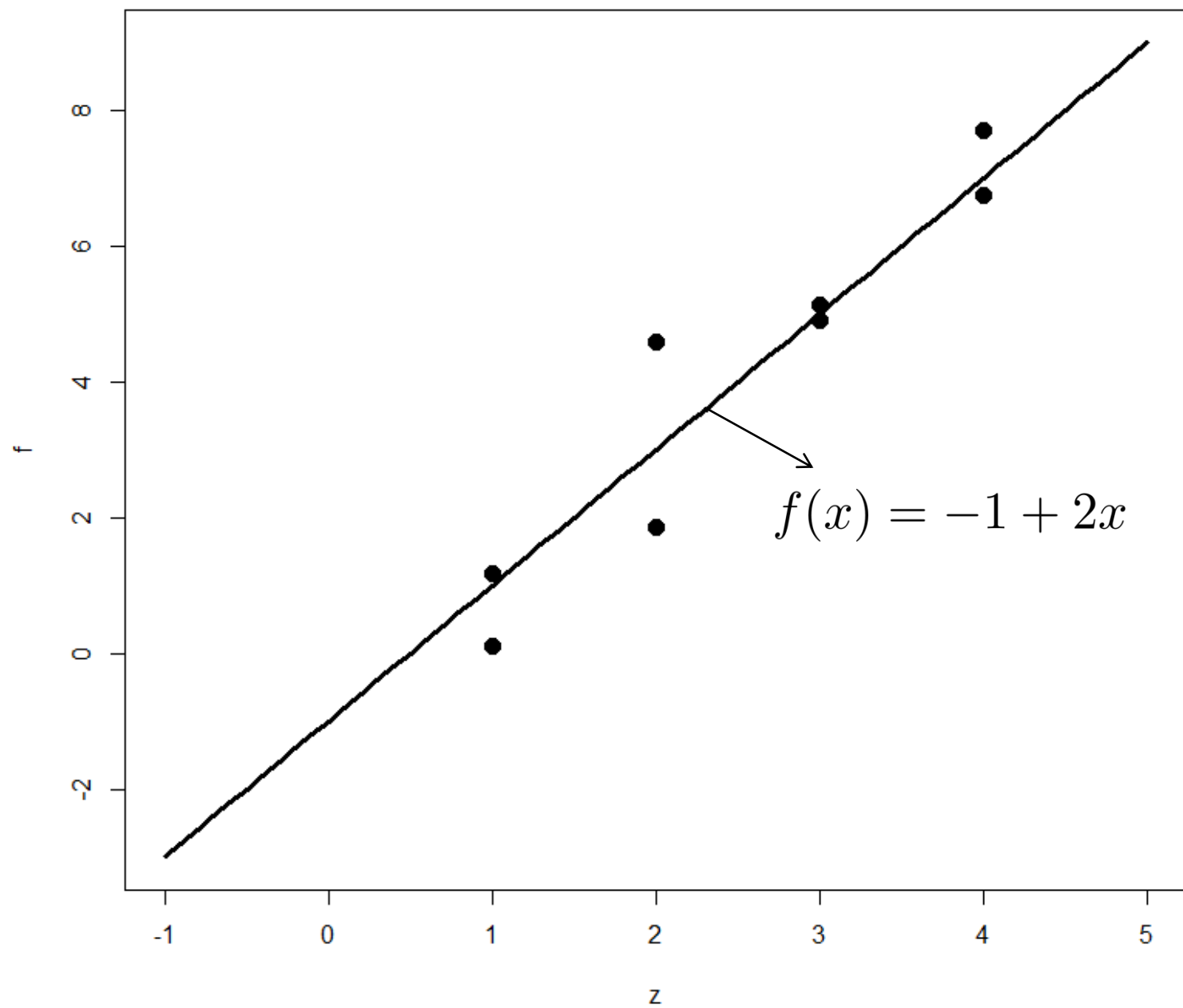


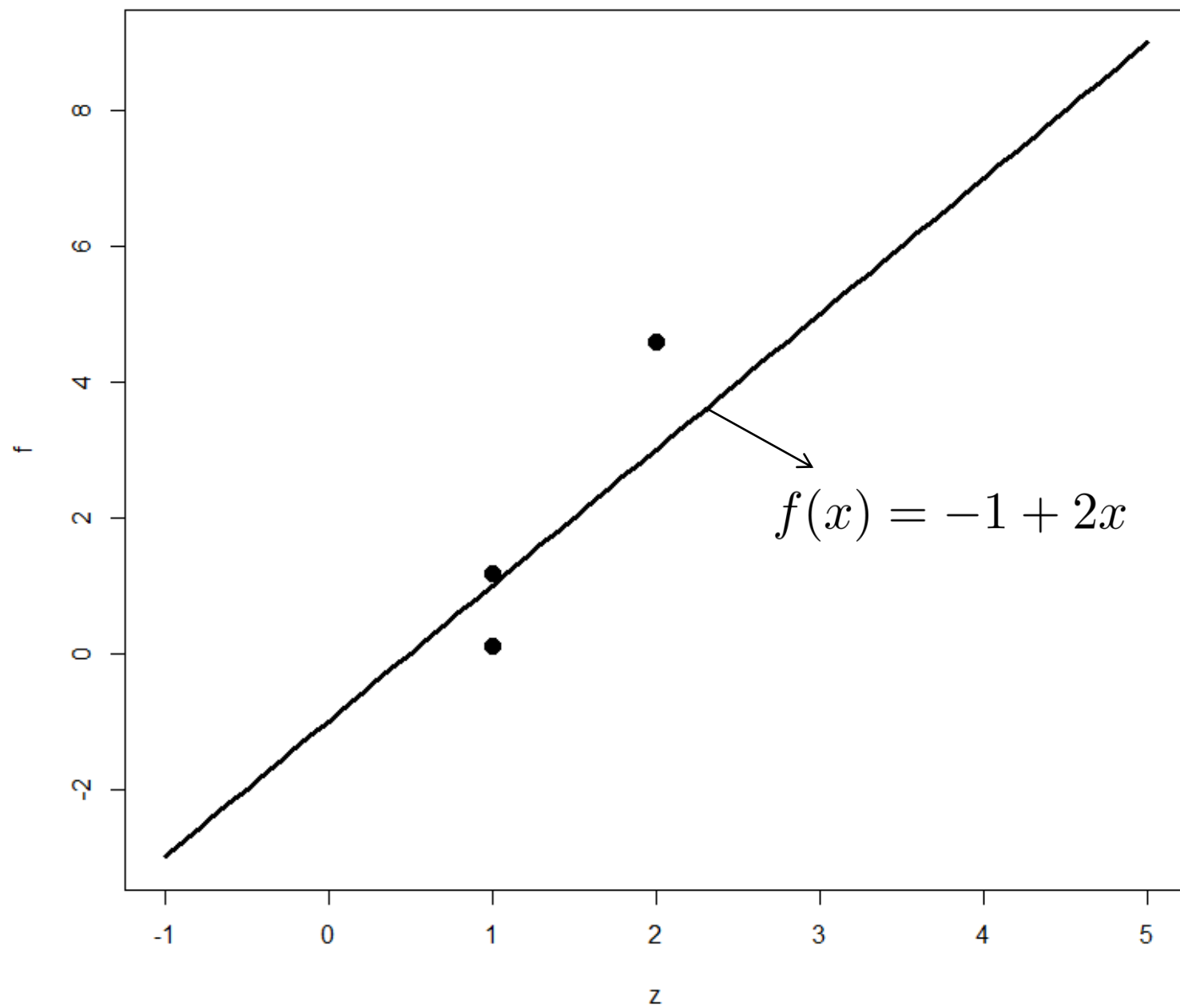


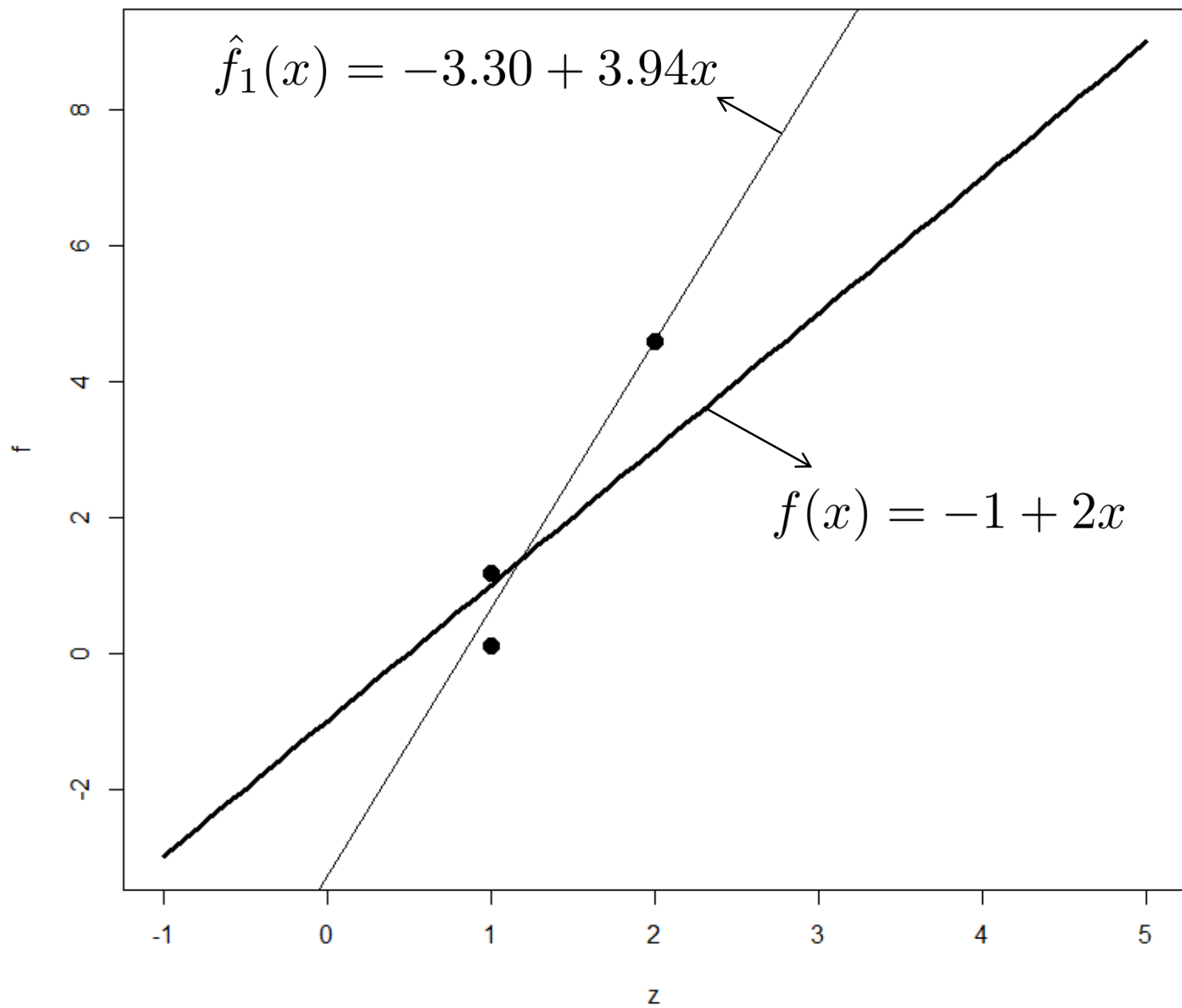
Q1. 왜 24개의 회귀직선만 적합 되었을까...?
나머지 4개는 왜 적합이 되지 않지...?

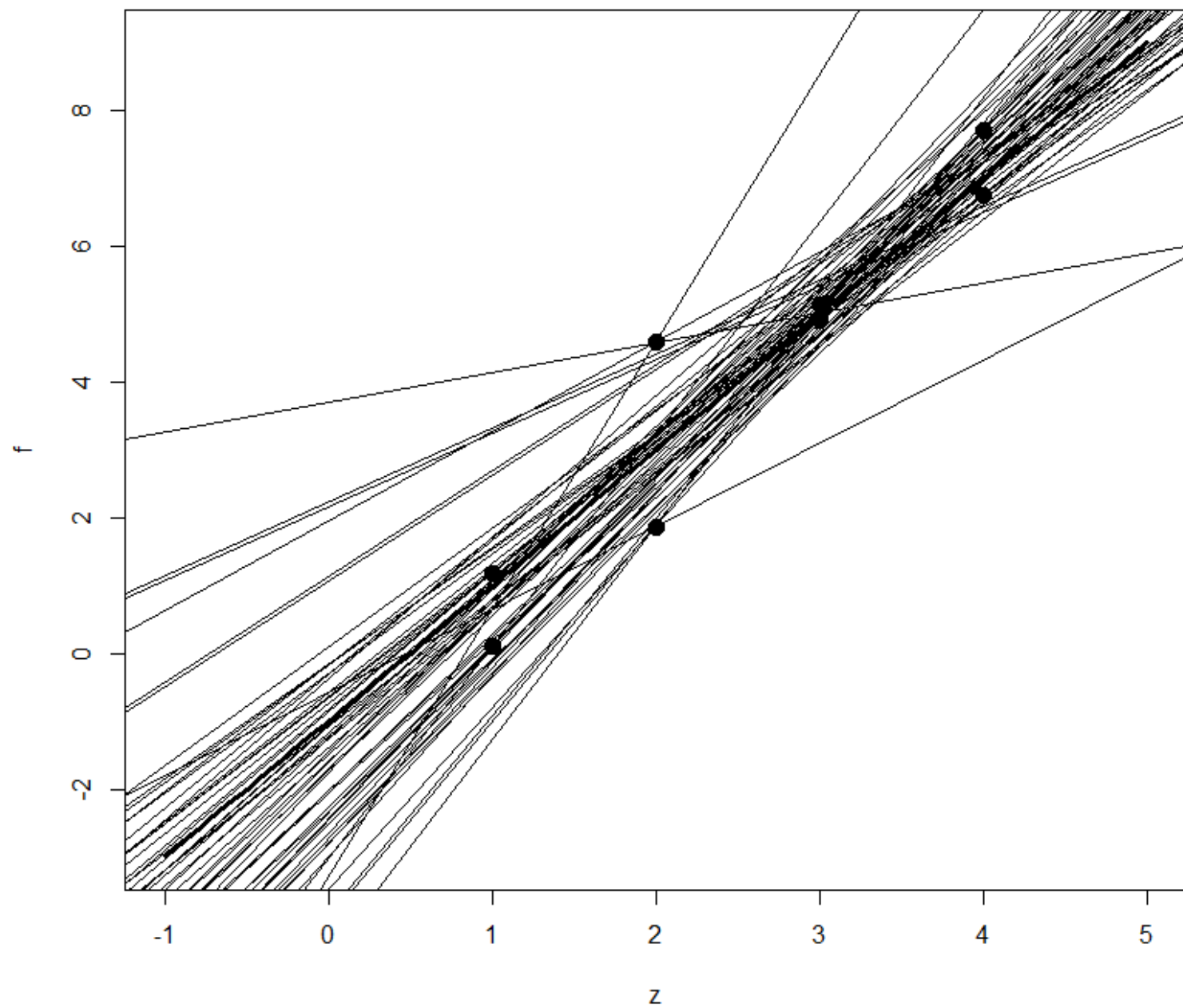


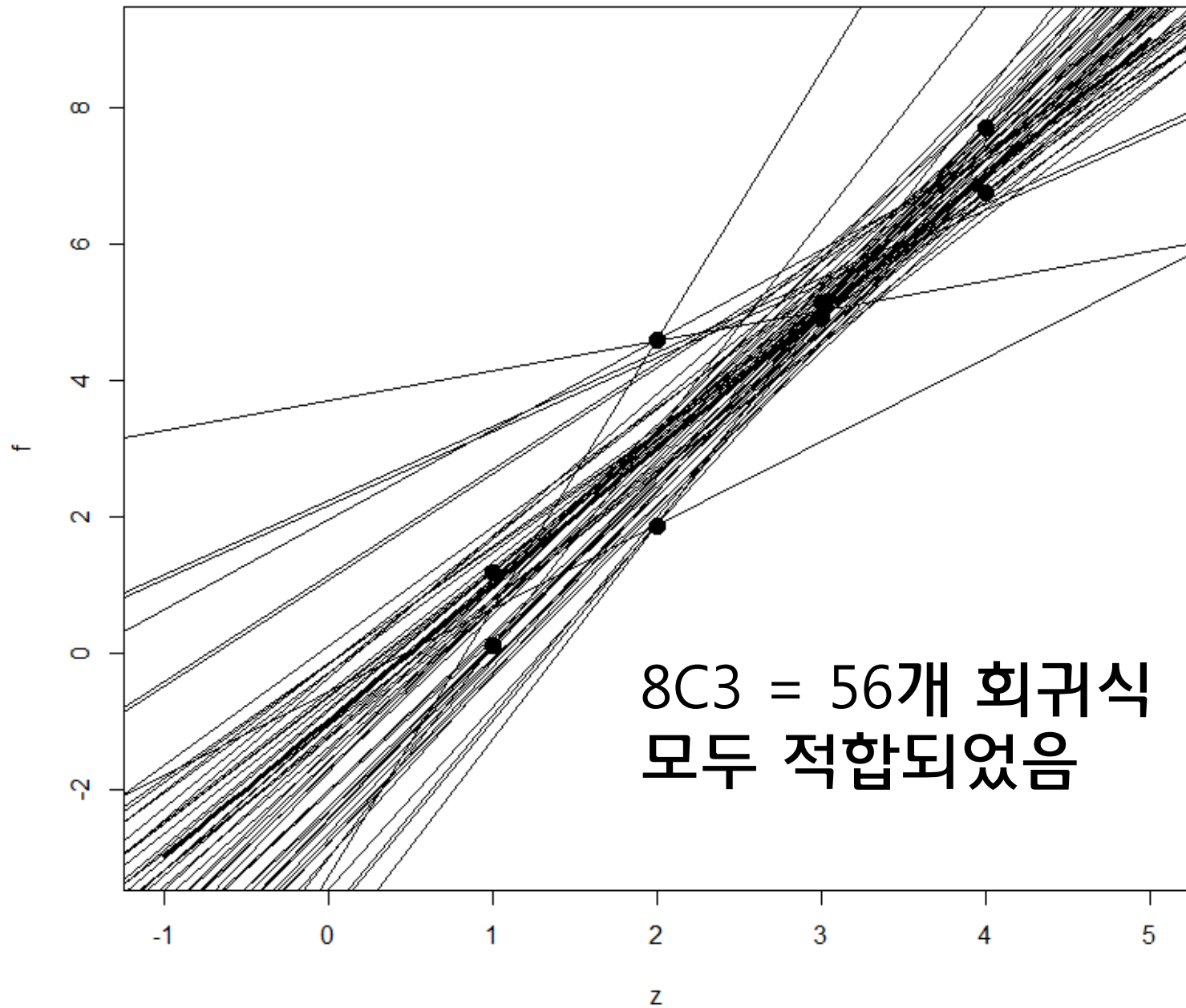


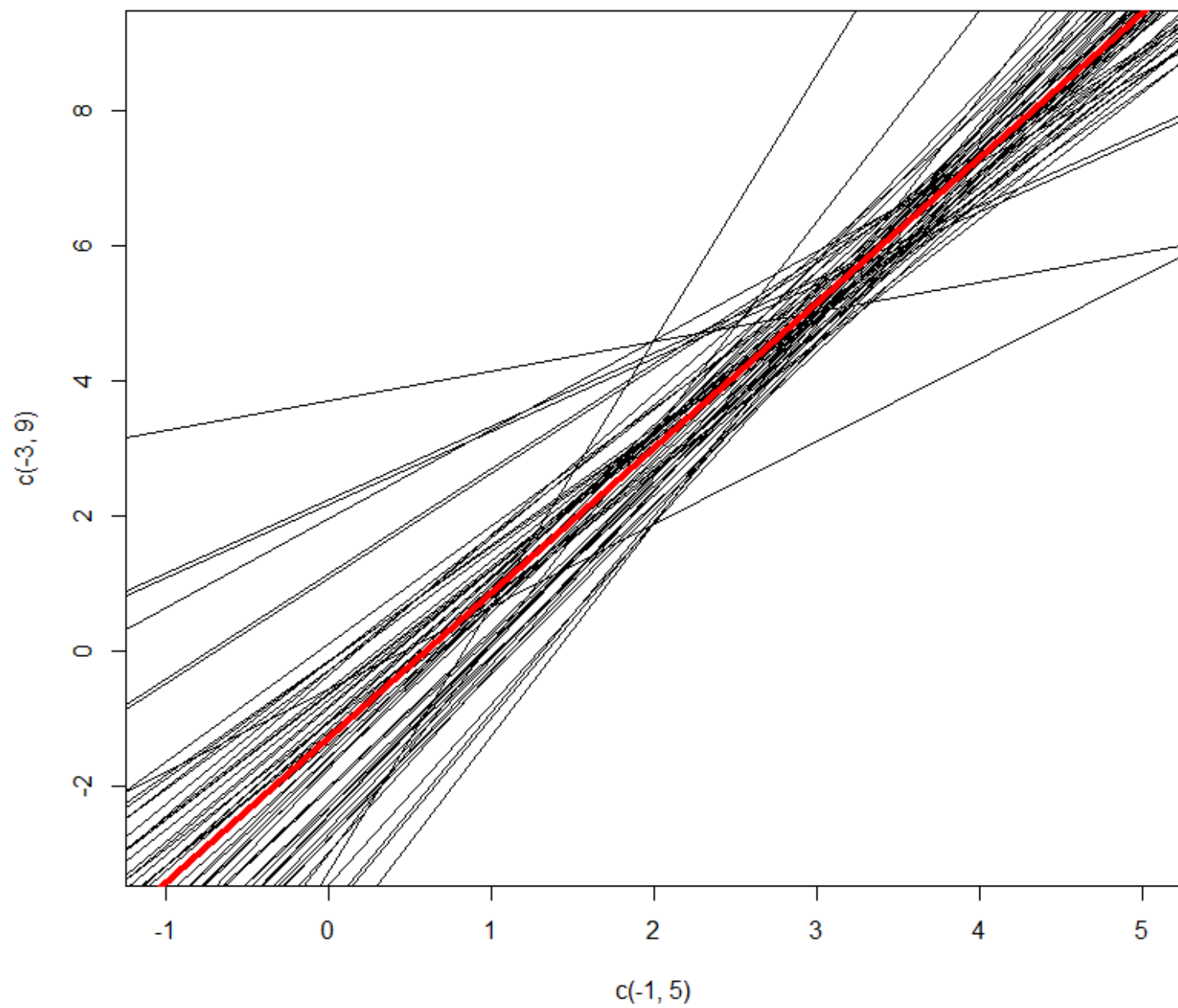


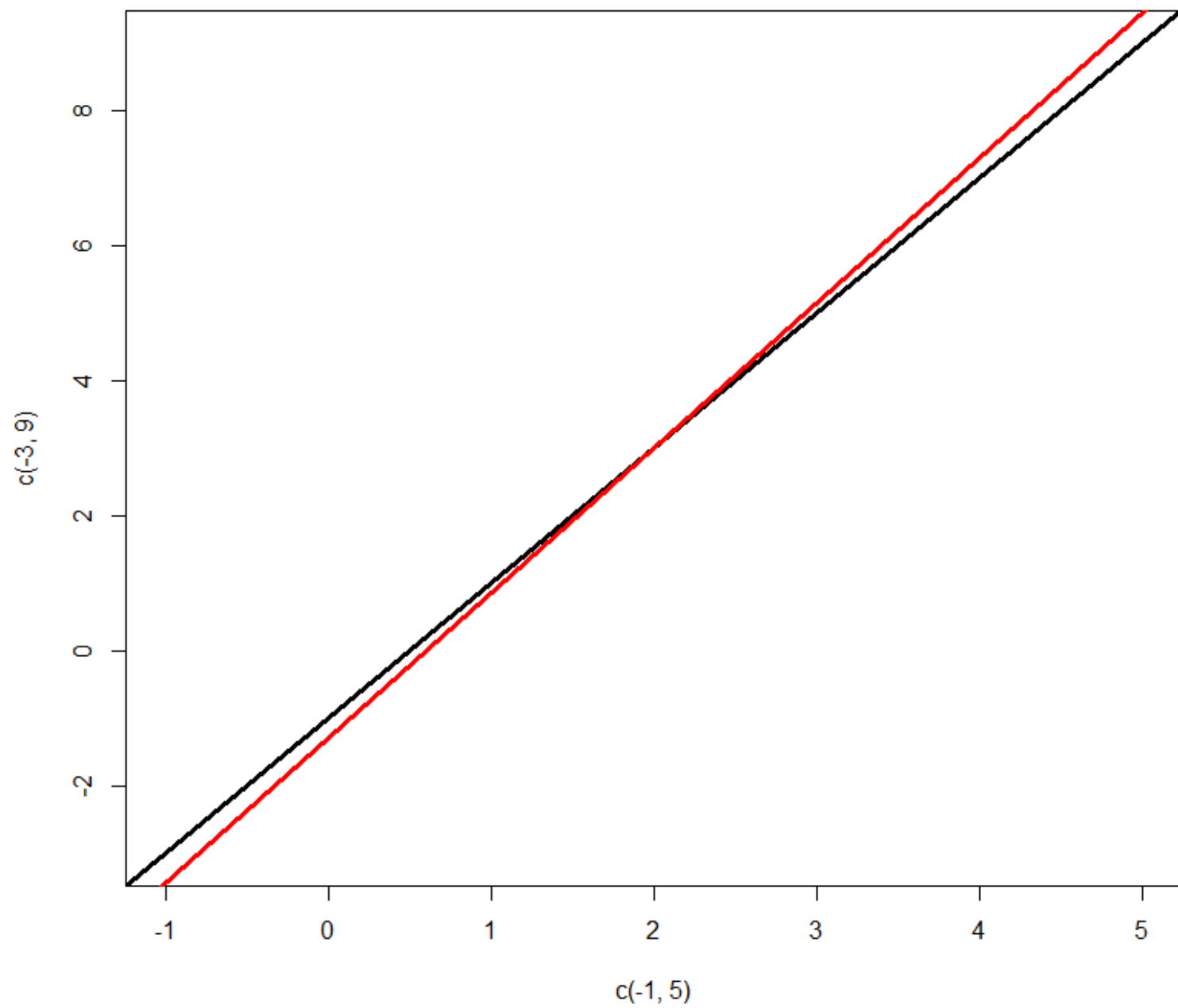


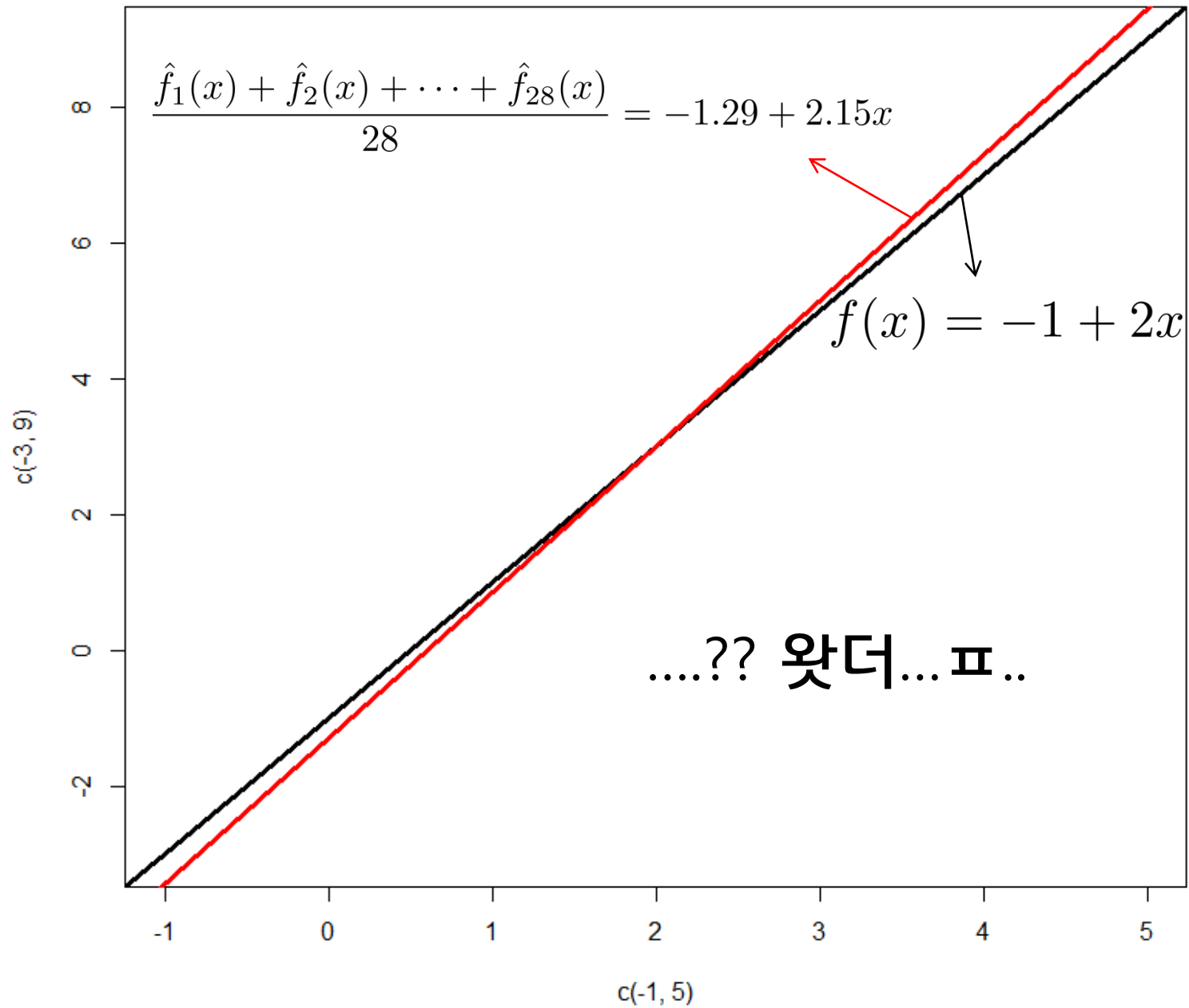












Q2. 왜 Unbiasedness가 아니지????

