1. **Problem**
For 56 firms the number of employees $X$ and the amount of expenses for continuing education $Y$ (in EUR) were recorded. The statistical summary of the data set is given by:

| | Variable $X$ | Variable $Y$ |
|---|---|---|
| Mean | 46 | 220 |
| Variance | 140 | 1827 |

The correlation between $X$ and $Y$ is equal to 0.61.

Estimate the expected amount of money spent for continuing education by a firm with 44 employees using least squares regression.

**Solution**
First, the regression line $y_i = \beta_0 + \beta_1 x_i + \varepsilon_i$ is determined. The regression coefficients are given by:

$$\hat{\beta}_1 = r \cdot \frac{s_y}{s_x} = 0.61 \cdot \sqrt{\frac{1827}{140}} = 2.20361,$$
$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \cdot \bar{x} = 220 - 2.20361 \cdot 46 = 118.63386.$$

The estimated amount of money spent by a firm with 44 employees is then given by:

$$\hat{y} = 118.63386 + 2.20361 \cdot 44 = 215.593.$$