Homework 03.11

Use the *lm()* function to perform a simple linear regression on the Boston data set with *medv* as the response and *rm* as the predictor. Use the *summary()* function to print the results. Comment on the output.

The simple linear model:

$$(medv) = \beta_0 + \beta_1(rm) + \varepsilon, E(\varepsilon) = 0, Var(\varepsilon) = \sigma^2$$

1. Find out $\hat{\beta}_0$, $\hat{\beta}_1$, and $\hat{\sigma}$.
2. Provide an interpretation of $\hat{\beta}_1$.
3. Based on the results Is there a relationship between the predictor and the response? Use the p-value in the printed result, and write down the null and the alternative hypothesis.
4. Find out the 95% confidence interval of $\hat{\beta}_0$, $\hat{\beta}_1$.
5. According to the printed results of *summary()*, write down the equation describing the prediction for y_i based on the value of x_i.
6. If we have *rm* equal to 6, what is the predicted value of *medv* based on *rm* = 6?