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* KHOONG WEI HAO ST2137 Tutorial 9 T03;

*Q3;
data t9q3;
    infile "~/data/rent.txt" firstobs=2;
    input rent size;

*(a)-(b);
proc reg data=t9q3;
    title "Regression Line for Rent-Size Data";
    model rent = size;
    output out=t9q3out p=yhat r=resid;
run;

*Ans: Since the p-value < 0.05, we reject the null hypothesis and conclude that there
is evidence of a linear relationship.;

*(c);
*Ans: From the output, R-square = 0.7226.;

*(d);
*Ans: From the residual plot, no obvious pattern can be seen.;

*(e);
*Ans: From the residual QQ-plots, we observe that the residuals are close to the fitted line,
showing signs of normality. So we try to validate this with the KS test.;

*Test for normality;
proc univariate data=t9q3out;
    var resid;
    histogram resid/ normal noplot;
    qqplot resid;
run;
*Ans: Since the p-value of the KS test is > 0.150 > 0.05, we do not reject the null hypothesis
and conclude that there is insufficient evidence to indicate that the residuals do not follow
a normal distribution.;

*(f);
*Ans: Multiplying the fitted coefficents (betas) to 1000, i.e. beta_0_hat + beta_1_hat * 1000,
we obtain the predicted cost to be y_hat = $1242.265.;

*(g);
*Ans: Since the predicted value for an apartment with 1000 square feet is $1242.265 < $1275 (current cost) and
for an apartment with 1200 square feet is $1455.294 > $1425 (current cost), the 1200 square feet apartment is a
better option as its cost is lower than its estimated cost.;
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