

## Quizzes for STA371G, Spring 2016

Quiz 1. Consider the model:

MPGfit= lm(mpg~weight+horsepower+displacement+acceleration+cylinders)

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	4.626e+01	2.669e+00	17.331	<2e-16 ***
weight	-5.187e-03	8.167e-04	-6.351	6e-10 ***
horsepower	-4.526e-02	1.666e-02	-2.716	0.0069 **
displacement	-8.313e-05	9.072e-03	-0.009	0.9927
acceleration	-2.910e-02	1.258e-01	-0.231	0.8171
cylinders	-3.979e-01	4.105e-01	-0.969	0.3330

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Residual standard error: 4.247 on 386 degrees of freedom

Multiple R-squared: 0.7077, Adjusted R-squared: 0.7039

F-statistic: 186.9 on 5 and 386 DF, p-value: < 2.2e-16

1. Explain the relationship between MPG and Horsepower
2. Should we reject the Null Hypothesis that  $\beta_1 = \beta_2 = \dots = \beta_5 = 0$ ?
3. Provide a suggestion to reduce the standard error of the regression coefficient for Horsepower

Quiz 2. Consider the model:

MidCity = lm(Price~dn2+dn3+SqFt+Brick+Bedrooms+Bathrooms)

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	17919.446	10474.046	1.711	0.08967 .
dn2TRUE	4865.694	2721.805	1.788	0.07633 .
dn3TRUE	34083.719	3168.987	10.755	< 2e-16 ***
SqFt	35.930	6.404	5.610	1.30e-07 ***
BrickYes	18507.779	2396.302	7.723	3.65e-12 ***
Bedrooms	1902.169	1902.270	1.000	0.31933
Bathrooms	6826.925	2562.812	2.664	0.00878 **

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Residual standard error: 12150 on 121 degrees of freedom

Multiple R-squared: 0.805, Adjusted R-squared: 0.7954

F-statistic: 83.27 on 6 and 121 DF, p-value: < 2.2e-16

- 1 Is there sufficient evidence to conclude that Brick Houses are sold at a premium?
- 2 Why not include "dn1" into the regression model?
- 3 Explain the relationship between "Price" and "SqFt".
- 4 Why not include "offers" into the regression model?

Quiz 3. Consider the model:

`lm(formula = log(mpg) ~ log(horsepower) + log(weight))`

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	10.10954	0.28614	35.330	< 2e-16 ***
log(horsepower)	-0.35985	0.04667	-7.711	1.05e-13 ***
log(weight)	-0.67347	0.05698	-11.818	< 2e-16 ***

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Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

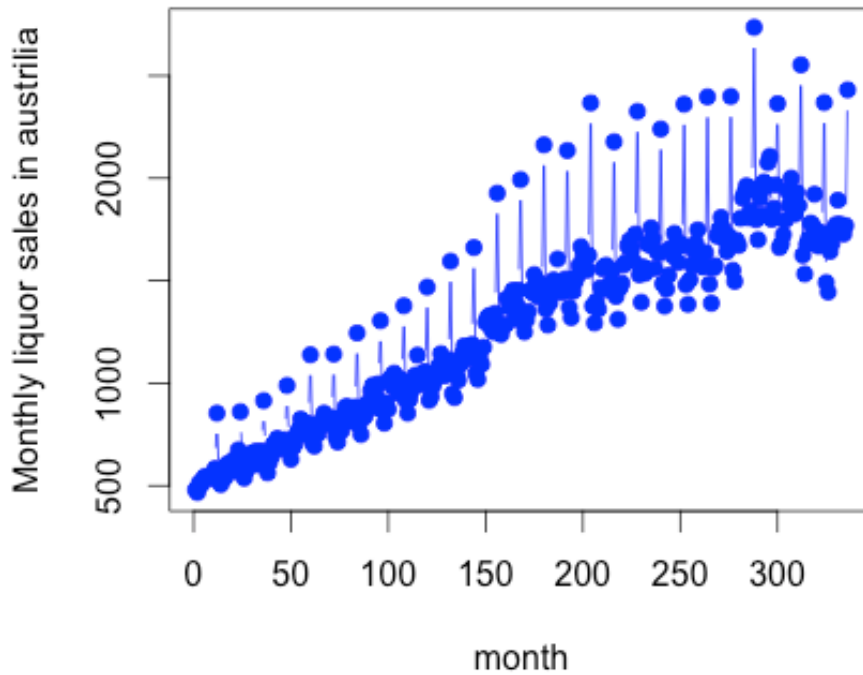
Residual standard error: 0.154 on 389 degrees of freedom

Multiple R-squared: 0.796, Adjusted R-squared: 0.7949

F-statistic: 758.7 on 2 and 389 DF, p-value: < 2.2e-16

1. Explain the relationship between "mpg" and "horsepower."

Quiz 4. Describe the time series for monthly liquor sales:



1. What kind of patterns could you observe from this time series?
2. If you forecast future liquor sales based on this time series, what would be your underlying assumption?
3. Propose a model that can be used to describe the data and forecast future liquor sales.