Question 1:

Part b:
- The coefficient value for the year is 0.56.
- Here, the coefficient sign is positive which indicates as the predictor variable increases(year), the response variable(mpg) also increases.
- The coefficient value represents the mean change in the response given a one unit change in the predictor. Here for the year where the coefficient is 0.56, the mean response value is changed at the rate of 0.56 every one unit change in the predictor.
- Mean Squared error of the model on the test data is 1.874651041529805e-06. The model score is 0.9199.

Part c:
The following table shows the coefficient values of different attributes and their interpretation.

Attributes	Coeff Values	Interpretation
Cylinders	0.84020765	Increases the response value (i.e y) at the rate of 0.84020765
Displacement	-0.11601289	Decreases the response value (i.e y) at the rate of 0.11601289
Horsepower	-0.1712066	Decreases the response value (i.e y) at the rate of 0.1712066
Weight	-1.61009463	Decreses the response value (i.e y) at the rate of 1.61009463
Acceleration	-0.27982384	Decreses the response value (i.e y) at the rate of 0.27982384
Model year	0.56987164	Increases the response value (i.e y) at the rate of 0.56987164
Origin	0.846842289	Increases the response value (i.e y) at the rate of 0.846842289

Observations:
- The attributes that positively increase the response value the most are Origin and Cylinders.
- The attribute that decreases the response value the most of weight.

Part d:
The following table shows the mean square error of all the models

	Ordinary Linear Regression	Lasso	Ridge
Mean Square Error	1.87465104152981E-06	1.82951778022641E-06	1.9148776877261E-06

Observations:
- The mean square error is the least for Lasso. Hence, the best model
- The mean square error is the highest for Ridge.

The following table shows the coefficient values of the lasso and ridge regressor and their interpretation.

Attributes	Coeff Values for Ordinary Linear Egg	Coeff Values of Lasso	Coeff Values of Ridge	Interpretation
Cylinders	0.84020765	0.36516346	0.02053449	- The magnitude effect of Cylinder attribute is more on Ordinary Linear regression compared to Ridge regressor and Lasso regressor as the coefficient value is more for Ordinary Linear regression. - Since the values are positive for Lasso, Ordinary and Ridge, its increases the response value
Displacement	-0.11601289	-0.083077	-0.01912991	- The magnitude effect of Displacement attribute is more on Ordinary Linear regression compared to Ridge regressor and Lasso regressor as the coefficient value is more for Ordinary Linear regression. - Since the values are negative for Ordinary Linear regression, Lasso and Ridge, its decreases the response value
Horsepower	-0.1712066	-0.14572326	-0.03005851	- The magnitude effect of Horsepower attribute is more on Ordinary Linear regression compared to Ridge regressor and Lasso regressor as the coefficient value is more for Ordinary Linear regression. - Since the values are negative for Ordinary Linear regression, Lasso and Ridge, its decreases the response value
Weight	-1.61009463	-1.27578323	-0.04396165	- The magnitude effect of Weight attribute is more on Ordinary Linear regression compared to Ridge regressor and Lasso regressor as the coefficient value is more for Ordinary Linear regression. - Since the values are negative for Ordinary Linear regression , Lasso and Ridge, its decreases the response value

Attributes	Coeff Values for Ordinary Linear Egg	Coeff Values of Lasso	Coeff Values of Ridge	Interpretation
Acceleration	-0.27982384	-0.1934937	0.10153373	- The magnitude effect of Acceleration attribute is more on Ridge regressor compared to Lasso regressor and Ordinary Linear regression as the coefficient value is more for Ridge. - Since the coeff of Ridge is positive, it increases the response value. - However, since the coeff of Lasso and Ordinary Linear regression are negative, it decreases the response value.
Model year	0.56987164	0.58473246	0.54081557	- The magnitude effect of model year attribute is more on Lasso regressor compared to Ridge regressor and Ordinary Linear regression as the coefficient value is more for Lasso. - Since the values are positive for Ordinary Linear regression, Lasso and Ridge, its increases the response value
Origin	0.846842289	0.81942232	0.03769747	- The magnitude effect of origin attribute is more on Ordinary Linear regression compared to Ridge regressor and Lasso regressor as the coefficient value is more for Ordinary Linear regression. - Since the values are positive for Ordinary Linear regression, Lasso regressor and Ridge regressor, its increases the response value