test

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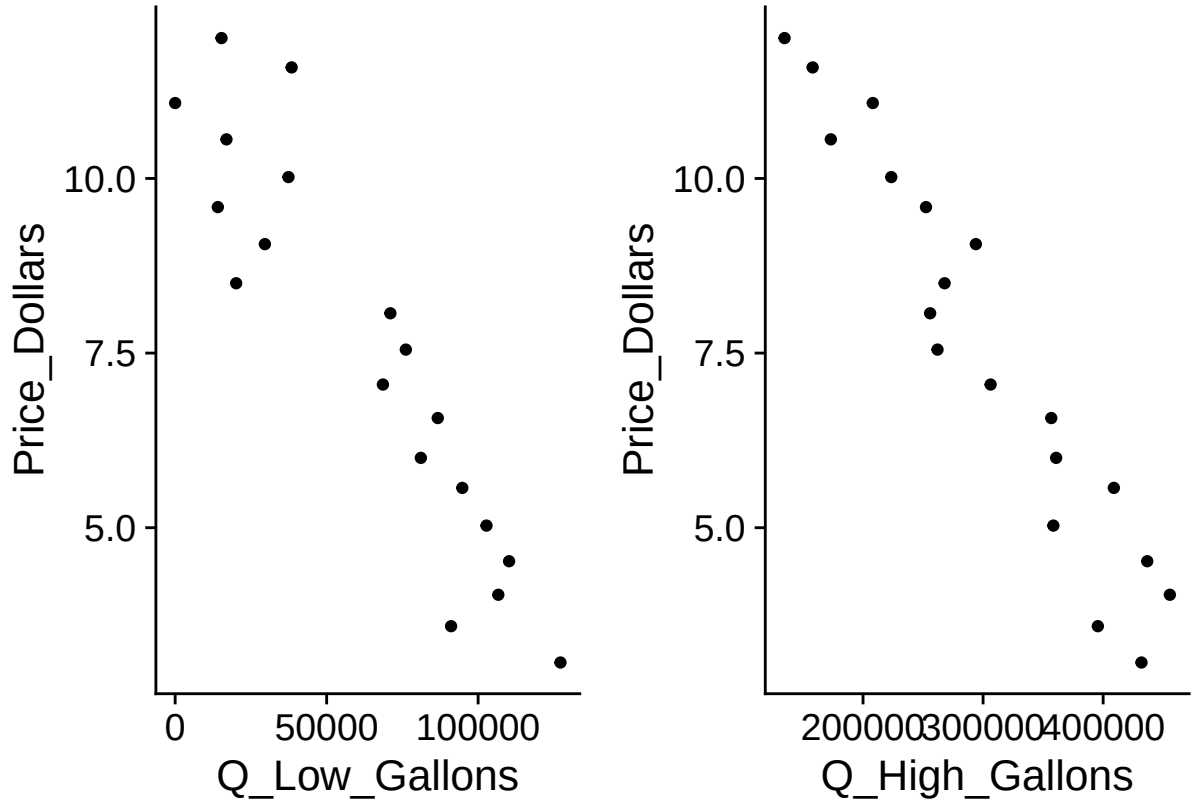
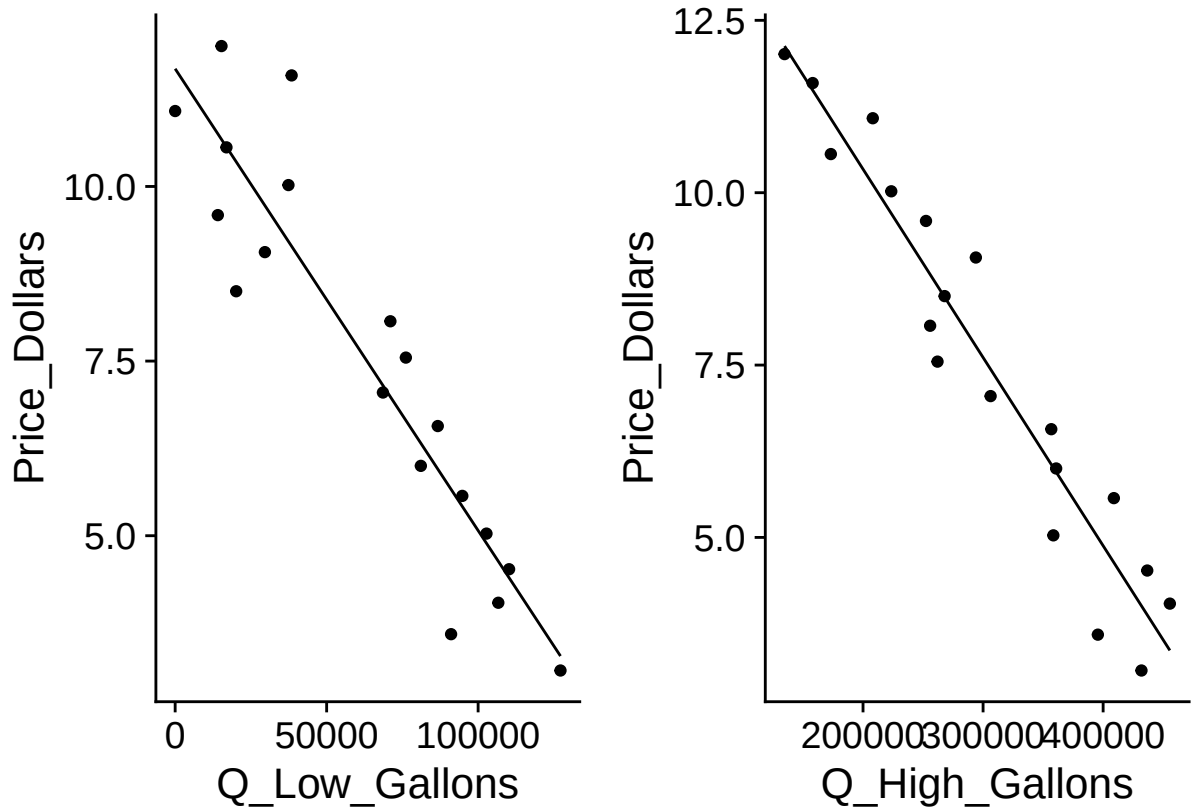
```
# Read in the data

demand_data <- read.csv(here("data", "HW3_data.csv"), stringsAsFactors = F)

# Exploratory plots
plot_1 <- ggplot(data=demand_data, aes(x=Q_Low_Gallons,y=Price_Dollars))+
  geom_point()+
  theme_cowplot(16)

plot_2 <- ggplot(data=demand_data, aes(x=Q_High_Gallons,y=Price_Dollars))+
  geom_point()+
  theme_cowplot(16)

plot_1 + plot_2
```



```r
# Estimate linear models

## Low income group linear models:

low_demand_model <- lm(Price_Dollars ~ Q_Low_Gallons, data = demand_data)
# low_demand_model$coefficients # Call the coefficients

al <- low_demand_model$coefficients[[1]] # "al" is the "a" coeff. for low demand
bl <- low_demand_model$coefficients[[2]] # "bl" is the "b" coeff. for low demand

## High income group linear models:

high_demand_model <- lm(Price_Dollars ~ Q_High_Gallons, data = demand_data)
# high_demand_model$coefficients # Call the coefficients

ah <- high_demand_model$coefficients[[1]] # "ah" is the "a" coeff. for high demand
bh <- high_demand_model$coefficients[[2]] # "bh" is the "b" coeff. for high demand
```

```r
# Add our estimated curves to our plots

price_low_fitted <- al + bl*demand_data$Q_Low_Gallons
price_high_fitted <- ah + bh*demand_data$Q_High_Gallons

(plot_1+
  geom_line(aes(y=price_low_fitted, x=Q_Low_Gallons))) +
(plot_2+
   geom_line(aes(y = price_high_fitted, x = Q_High_Gallons)))
```




```
# Now create functions for our lines, and add them to the same plot

# P(Q)
inverse_demand <- function(q, model){
  p <- model$coefficients[[1]] + model$coefficients[[2]]*q
return(p)
}

## Inverse P(Q) to get Q(P)
demand <- function(p, model){
  q <- (p - model$coefficients[[1]])/model$coefficients[[2]]
  return(q)
}

low_demand_curve <- function(x) low_demand_model$coefficients[[1]] + low_demand_model$coefficients[[2]]
high_demand_curve <- function(x) high_demand_model$coefficients[[1]] + high_demand_model$coefficients[[

ggplot(data = demand_data, aes(y = Price_Dollars, x = Q_High_Gallons))+
  stat_function(fun = low_demand_curve,
                color = "red")+
  stat_function(fun = high_demand_curve,
                color = "green")+
  annotate("text", x = 400000, y = 17, color = "red", label = "Low Income Group")+
  annotate("text", x = 400000, y = 19, color = "green", label = "High Income Group")+
  theme_bw()+
  labs(
```

```
    y = "Price (USD)",
    x = "Quantity (gallons)",
    title = "Demand Curves for Gasoline"
  )+
  geom_hline(aes(yintercept = 0))+
  geom_vline(aes(xintercept = 0))+
  theme(plot.title = element_text(hjust = 0.5))+
  ylim(0, 20)+
  xlim(0, 600000)
```