Assignment_2

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```
#load packages and read in data

library(tidyverse)
```

```
## Warning: package 'tidyverse' was built under R version 3.5.3

## Warning: package 'ggplot2' was built under R version 3.5.3

## Warning: package 'tibble' was built under R version 3.5.2

## Warning: package 'dplyr' was built under R version 3.5.2
```

```
library(ggplot2)

gas <- read_csv("Gas_Data.csv")
```

```
#Part 1.

#complete linear regression to find demand equations

#low demand

low_demandlm <- lm(Price_Dollars ~ Q_Low_Gallons_per_Day, data = gas)

low_demandlm
```

```
##
## Call:
## lm(formula = Price_Dollars ~ Q_Low_Gallons_per_Day, data = gas)
##
## Coefficients:
##           (Intercept)  Q_Low_Gallons_per_Day
##            21.9908534             -0.0001355
```

```
#high demand

high_demandlm <- lm(Price_Dollars ~ Q_High_Gallons_per_Day, data = gas)

high_demandlm
```

```
##
## Call:
## lm(formula = Price_Dollars ~ Q_High_Gallons_per_Day, data = gas)
##
## Coefficients:
##            (Intercept)  Q_High_Gallons_per_Day
##             23.3914418              -0.0001297
```

Problems 1 and 2:

1.

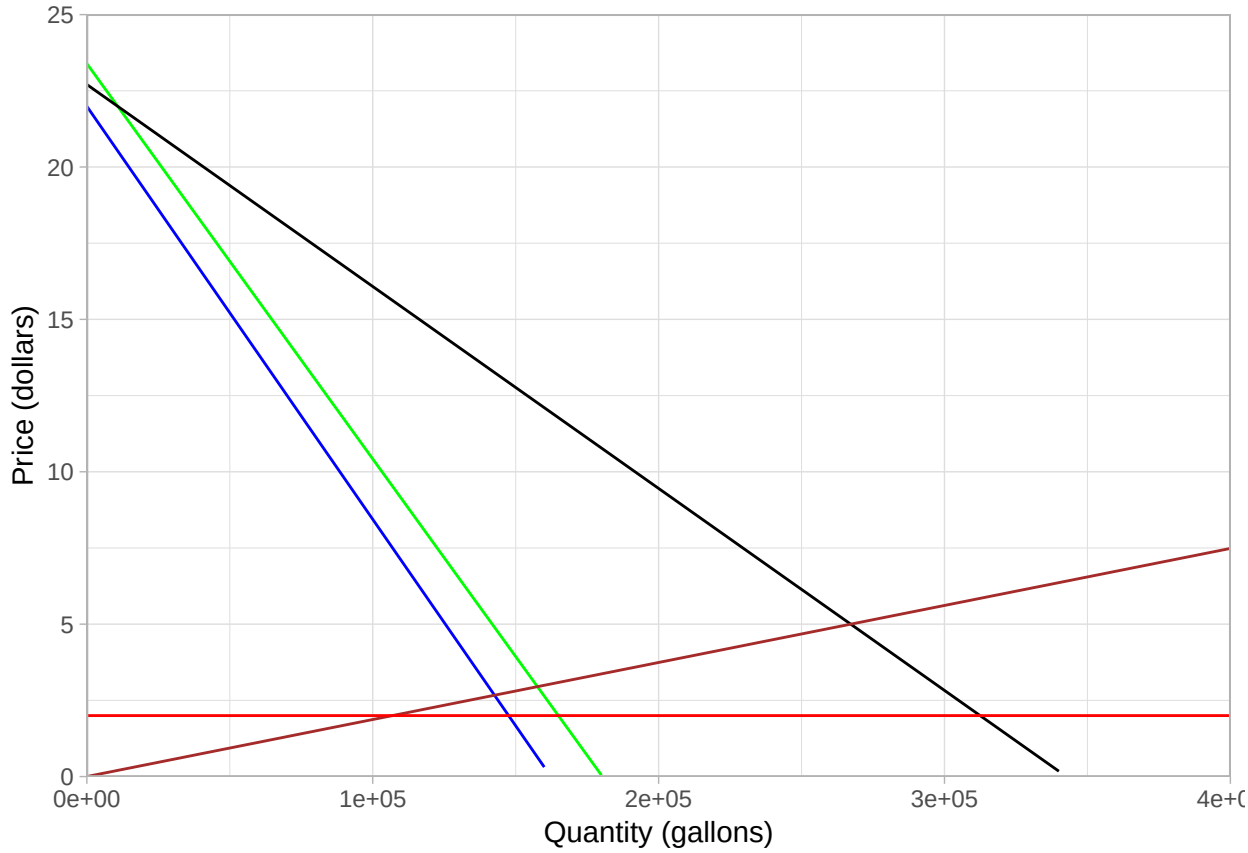
CS: 2365526.93 PS: 667984.0293 EC: 534387.2234

2.

CS(low): 1065273.429 CS(high): 1303951.933

```
#define functions and plot

Q_low <- function(x) 21.9908534 - 0.0001355 * x
Q_high <- function(x) 23.3914418 - 0.0001297 * x
Q_ag <- function(x) 22.70646323 - 0.000066268 * x
supply <- function(x) x * .000018713
mec <- function(x) 2

status_quo <- ggplot(data.frame(x = c(70000, 500000), y = c(0, 30)), aes(x = x, y = y)) +
  stat_function(fun = Q_low, geom = "line", color = "blue") +
  stat_function(fun = Q_high, geom = "line", color = "green") +
  stat_function(fun = Q_ag, geom = "line", color = "black") +
  stat_function(fun = supply, geom = "line", color = "brown") +
  stat_function(fun = mec, geom = "line", color = "red") +
  scale_x_continuous(expand = c(0,0), limits = c(0,400000)) +
  scale_y_continuous(expand = c(0,0), limits = c(0,25)) +
  labs(x = "Quantity (gallons)", y = "Price (dollars)") +
  theme_light()

status_quo
```

```
## Warning: Removed 60 rows containing missing values (geom_path).

## Warning: Removed 55 rows containing missing values (geom_path).

## Warning: Removed 15 rows containing missing values (geom_path).
```



Problem 3:

amount produced and sold: 259649.6534 price of gasoline: CS(low): CS(high): PS: EC: total revenue generated:

```
#define the functions and plot

Q_low <- function(x) 21.9908534 - 0.0001355 * x
Q_high <- function(x) 23.3914418 - 0.0001297 * x
Q_ag <- function(x) 22.70646323 - 0.000066268 * x
supply_tax1 <- function(x) x * .000021182
mec <- function(x) 2

tax1 <- ggplot(data.frame(x = c(70000, 500000), y = c(0, 30)), aes(x = x, y = y)) +
  stat_function(fun = Q_low, geom = "line", color = "blue") +
  stat_function(fun = Q_high, geom = "line", color = "green") +
  stat_function(fun = Q_ag, geom = "line", color = "black") +
  stat_function(fun = supply_tax1, geom = "line", color = "brown") +
  stat_function(fun = mec, geom = "line", color = "red") +
  scale_x_continuous(expand = c(0,0), limits = c(0,400000)) +
  scale_y_continuous(expand = c(0,0), limits = c(0,25)) +
  labs(x = "Quantity (gallons)", y = "Price (dollars)") +
  theme_light()

tax1
```

```
## Warning: Removed 60 rows containing missing values (geom_path).
```

```
## Warning: Removed 55 rows containing missing values (geom_path).
```

```
## Warning: Removed 15 rows containing missing values (geom_path).
```