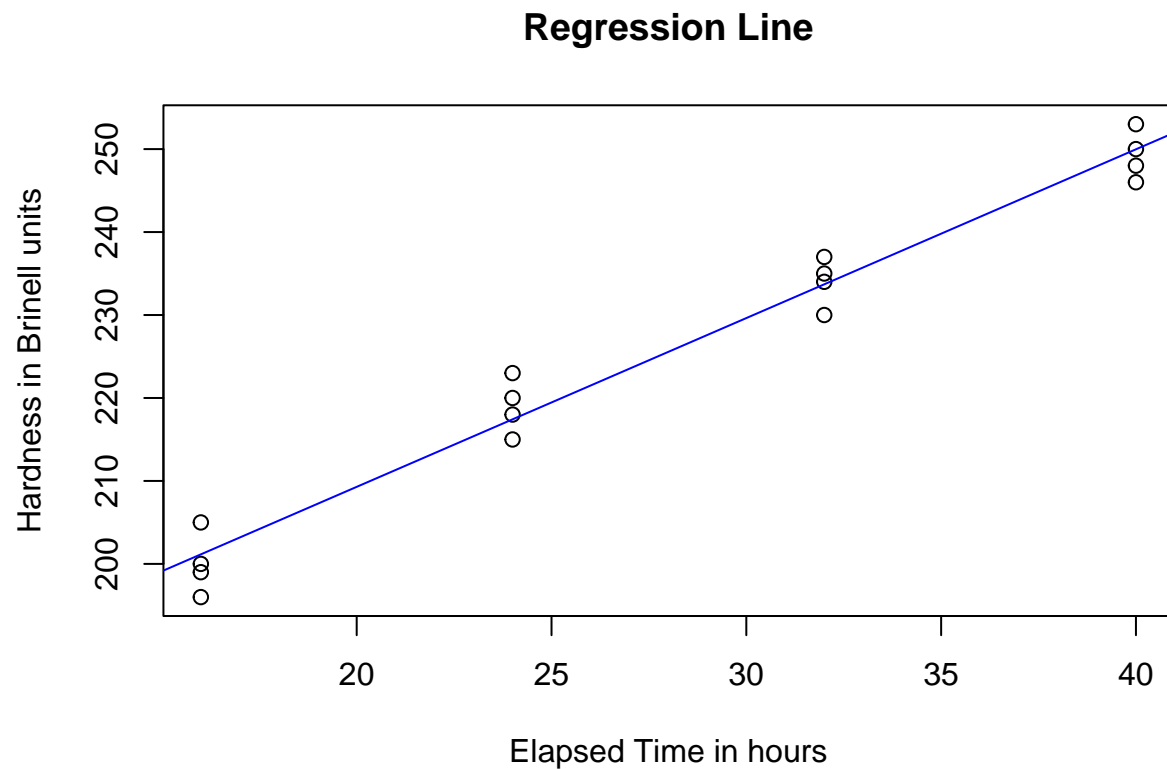# hw1 question 6

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Question (a)

```r
data <- read.csv("plastic-hardness.csv", header = TRUE)
model <- lm(Y ~ X,data = data)
plot(data$X, data$Y, main = "Regression Line",
     xlab = "Elapsed Time in hours", ylab = "Hardness in Brinell units")
abline(model, col = "blue")
```

Regression Line

Yes, it is a good fit.

Question (b)

```r
predict(model, newdata = data.frame(X = 40))
```

```
##        1
## 249.975
```

Question (c)

```
coef(model)[["X"]]
```

```
## [1] 2.034375
```

Question (d)

```
residuals <- resid(model)
sum(residuals)
```

```
## [1] -1.998401e-15
```

No, they don't sum to zero but the sum is very close to zero.

Question (e)

```
sigma_squared <- sum(residuals^2) / (model$df.residual)
sigma <- sqrt(sigma_squared)
sigma_squared
```

```
## [1] 10.45893
```

```
sigma
```

```
## [1] 3.234027
```

sigma   is the standard deviation of the error terms. It should be the same unit as Y. So it is in Brinell units.