Linear Regression Example

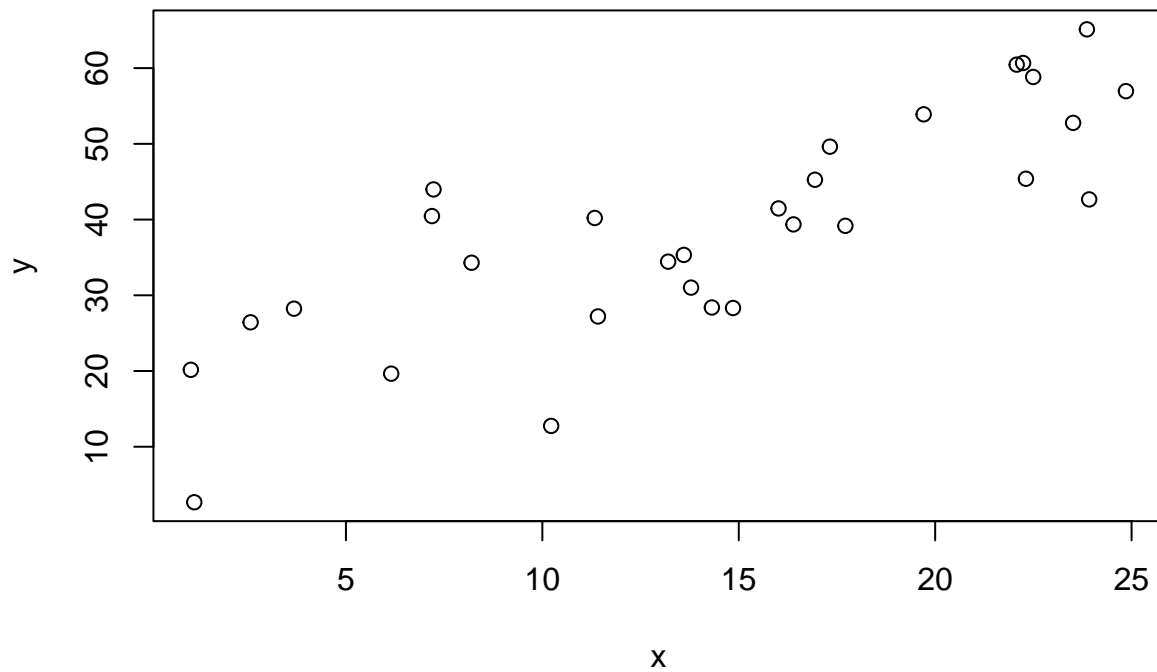## jdt

11/26/2020

Generate the Simulated Data

```
set.seed(123)
n=30          #sample size
beta_0=10     #true y-intercept
beta_1=2      #true slope
sigma= 9      #true sigma

x=25*runif(n)
y=beta_0 + beta_1*x + sigma*rnorm(n)
```

Graph of data

```
plot(y~x)
```

Results

```
result<-lm(y~x)
summary(result)
```

```
##
## Call:
## lm(formula = y ~ x)
##
## Residuals:
##      Min      1Q   Median      3Q      Max
## -19.2864  -6.4826   0.1758   6.3506  16.9309
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  15.0097     3.6258   4.140 0.000289 ***
## x             1.6652     0.2266   7.349 5.3e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 8.888 on 28 degrees of freedom
## Multiple R-squared:  0.6586, Adjusted R-squared:  0.6464
## F-statistic: 54.01 on 1 and 28 DF,  p-value: 5.296e-08
```

```
plot(result)
```


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Normal Q–Q

Theoretical Quantiles
lm(y ~ x)

Scale–Location

√|Standardized residuals|

Fitted values
lm(y ~ x)

Residuals vs Leverage

Standardized residuals

Leverage
lm(y ~ x)