i	x_i	y_i	$(x_i-\bar{x})$	$(x_i-\bar{x})^2$	$(y_i-\bar{y})$	$(y_i-\bar{y})^2$	$(x_i-\bar{x})(y_i-\bar{y})$	$\widehat{y_i} = \widehat{\beta_0} + \widehat{\beta_1} x_i$	$\widehat{u_i} = (y_i-\widehat{y_i})$	$\widehat{u_i}^2 = (y_i-\widehat{y_i})^2$
1	1	1	−1	1	−1	1	1	1+(½)×1= 1½	1−1½ = −½	¼
2	2	3	0	0	1	1	0	1+(½)×2= 2	3−2 = 1	1
3	3	2	1	1	0	0	0	1+(½)×3= 2½	2−2½ = −½	¼
Σ	6	6	SST_x =	2	SST_y =	2		$\Sigma\widehat{y_i}$ = 6	$\Sigma\widehat{u_i}$ = 0	SSR = 1½
Σ/n	$\bar{x}$ = 2	$\bar{y}$ = 2								
Σ/(n−1)				var(x)=1		var(y)=1	cov(x,y)= ½			

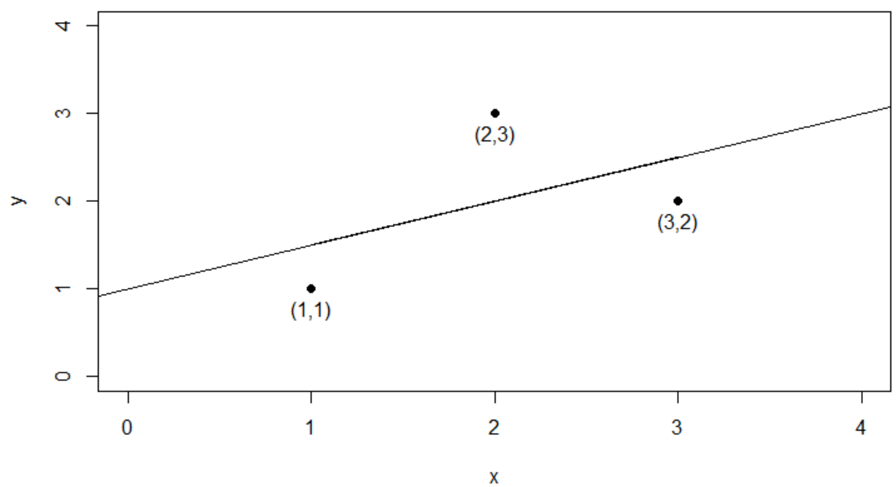
Intercept: $\widehat{\beta_0} = \bar{y} - \widehat{\beta_1}\bar{x} = 2 - {}^1\!/_2 \cdot 2 = 1$

Slope: $\widehat{\beta_1} = \dfrac{cov(x,y)}{var(x)} = \dfrac{{}^1\!/_2}{1} = {}^1\!/_2$

Coefficient of determination: $R^2 = \dfrac{SST_y - SSR}{SST_y}$ = (2−1½)/2 = .25

Root Mean-Squared Error: $sigma = \sqrt{\sigma^2} = \sqrt{\dfrac{SSR}{n-2}} =$ √(1½)/1 ≅ 1.225

```
> cartesian <- c("(1,1)", "(2,3)", "(3,2)")
> lim <- c(0,4)
> plot(x,y, pch=16, xlim = lim, ylim = lim)
> text(x,y, labels=cartesian, pos=1, xpd=TRUE)
> abline(a=model$coefficients[1],b=model$coefficients[2])
```




```
> x <- c(1,2,3)
> y <- c(1,3,2)
> model <- lm(y~x)
> summary(model)

Call:
lm(formula = y ~ x)

Residuals:
   1    2    3
-0.5  1.0 -0.5

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)    1.000      1.871   0.535    0.687
x              0.500      0.866   0.577    0.667

Multiple R-squared:   0.25         Adjusted R-squared:   -0.5

> sum(model$residuals)
[1] -5.551115e-17
> cor(model$residuals, x)
[1] 9.614813e-17

> model$fitted
  1   2   3
1.5 2.0 2.5
```

To add the regression line, could use `lines(x,fitted(model))` but this line will only extend to limits of domain of x

To be totally complete, this page should also include computations of $se(\widehat{\beta_1}) = \dfrac{\hat{\sigma}}{\sqrt{SST_x}}$ and $se(\widehat{\beta_0}) = \dfrac{\hat{\sigma}}{\sqrt{SST_x}} \cdot \sqrt{\dfrac{\sum x_i^2}{n}}$