Quiz 1, Stat 3

1. In the equation $E(Y) = b_0 + b_1 x$, what is the value of b_1 if x has no linear relationship to Y? Does this value indicate that there is no relationship between x and Y? Explain your answers.

2. The following is the output from a regression analysis in R. Weight is measured in kg and height in cm.

```
Call:
lm(formula = weight ~ height)
Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -101.3301    29.8617  -3.393  0.00105 **
height         0.9956     0.1676   5.939 5.92e-08 ***

Residual standard error: 10.07 on 86 degrees of freedom
Multiple R-squared:  0.2908
```

   (a) What is the sample size?

   (b) What is the estimated weight when height is 1.5 metres?

   (c) What is the estimated change in weight for 1cm change in height?

   (d) What is the sample correlation coefficient between height and weight?

   (e) What is the estimated variance of the error?

3. Suppose we have paired data $(x_1, y_1), \cdots, (x_n, y_n)$ and we are interested in the regression line of y on x.

   (a) What can you say about the least squares regression line when $x_1 = x_2 = \cdots = x_n$ and the y's are distinct?

   (b) What can you say about the least squares regression line when $y_1 = y_2 = \cdots = y_n$ and the x's are distinct?