homework 9

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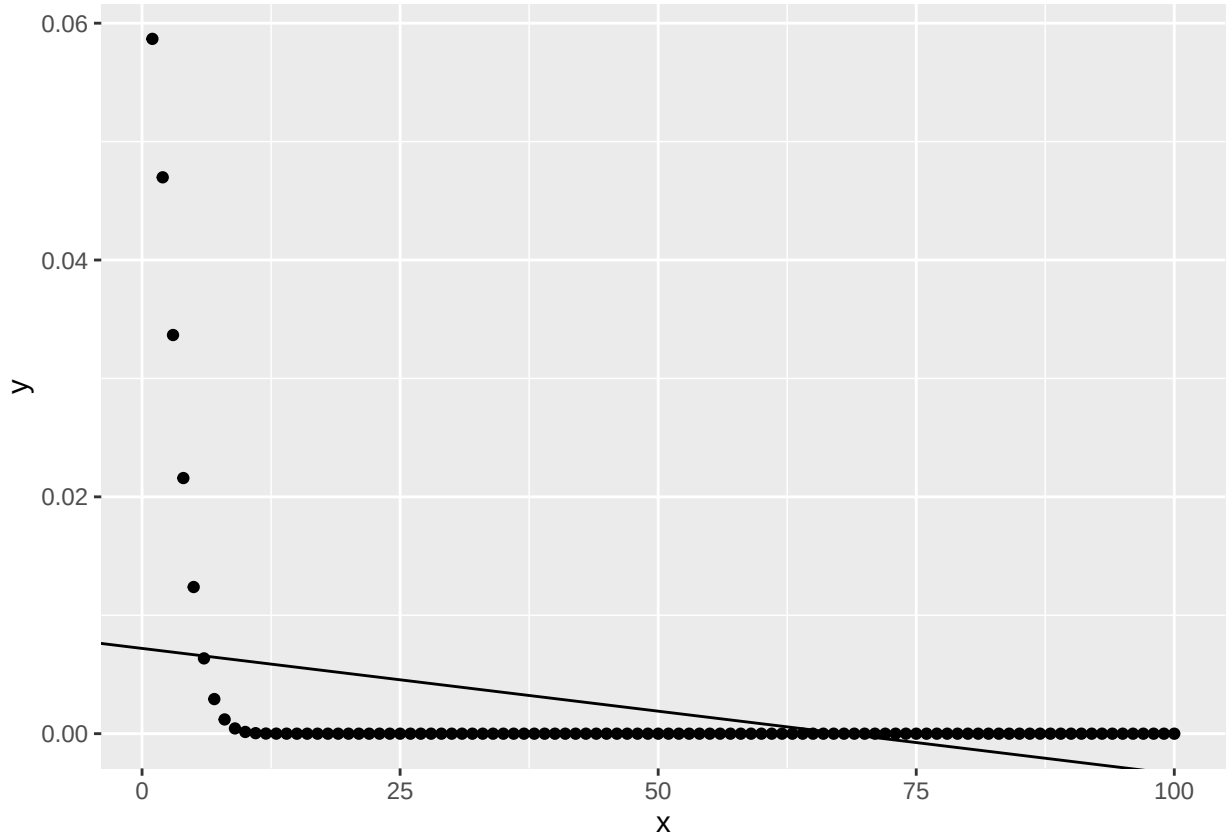
Problem 1 a)

```
x = seq(1, 100)
set.seed(1)
y = dnorm(1 + 2*x, sd = 6)
library(ggplot2)
ggplot() + geom_point(mapping = aes(x = x, y = y)) +
           geom_abline(slope = -0.000106, intercept = 0.0072)
```



Problem 1 b)

Step 1 Model

$$Y_i \sim N[1 + \beta_i * x_i, 6^2]$$

Step 2 Hypotheses

$$H_0 : \beta_1 = 2$$
$$H_a : \beta_1 \neq 2$$

Step 3 State test statistic

Two-sided significance test

Step 4 Evaluate test stat

```
df <- 99
t <- qt(0.05/2, df)
```

Step 5 State Significance level

$$\alpha = 0.05$$

Step 6 p-value under H_0

```
p <- 2 * (1 - pt(abs(t), df))
```

Thus, $p = 0.05$

Step 7 Decision

Since $\alpha = 0.05 \leq 0.05 = p$ we reject the null hypothesis. $\beta_1 \neq 2$.