Solution: Homework 2

1.

Frequency Table:

```
word_length |      Freq.
------------+----------------
          1 |            1
          2 |           22
          3 |           18
          4 |           22
          5 |           13
          6 |            8
          7 |            6
          8 |            1
          9 |            6
         10 |            2
         11 |            1
------------+----------------
      Total |          100
```

Standard Deviation

mean $= 4.35$

$$\sigma = \sqrt{\frac{\Sigma(x_i - \bar{x})^2}{n}}$$

$$= \sqrt{\frac{1(1 - 4.35)^2 + 22(2 - 4.35)^2 + 18(3 - 4.35)^2 + 22(4 - 4.35)^2 + 13(5 - 4.35)^2 + 8(6 - 4.35)^2 + 6(7 - 4.35)^2 + 1(8 - 4.35)^2 + 6(9 - 4.35)^2 + 2(10 - 4.35)^2 + 1(11 - 4.35)^2}{100}}$$

$$= 2.22$$

Histogram

2.

$X \sim N(\mu = 3, \sigma = 4)$

* -5, [-5: 5]
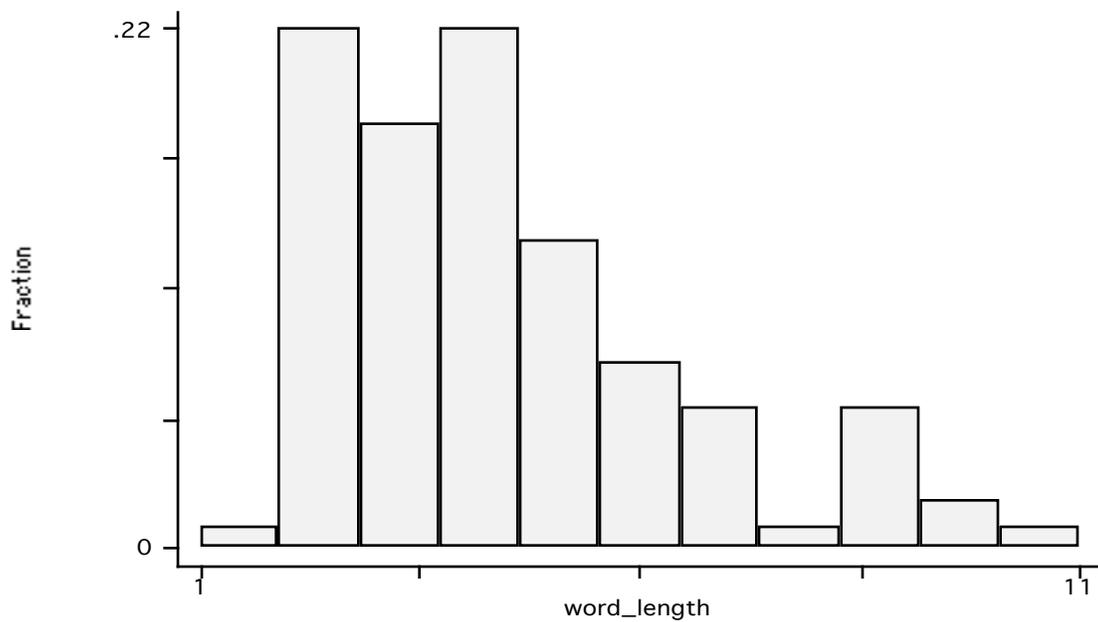
z-score: $z = \dfrac{-5 - 3}{4}$ find the area between -5 and 5: $P(-2 < Z < 2) = 0.9545$

$= -2$

* 11, [-infinity: 5]

z-score: $z = \dfrac{11 - 3}{4}$ find the area to the left of 11: $P(Z < 2) = 0.9772$

$= 2$

* 5, [5: 5]

z-score: $z = \dfrac{5 - 3}{4}$ find the area to the right 5: $P(0.5 < Z) = 0.3085$

$= \dfrac{1}{2}$

* 1.4, [0: 1.4]

z-score: $z = \dfrac{0 - 3}{4}$ find the area between 0 and 1.4: $P(-0.75 < Z < -0.4) = 0.1180$

$= -\dfrac{3}{4} = -0.75$

z-score: $z = \dfrac{1.4 - 3}{4}$

$= -0.4$

* There is no difference between them because normal distribution is a continuous random variable.