Solution: Homework 3

1.

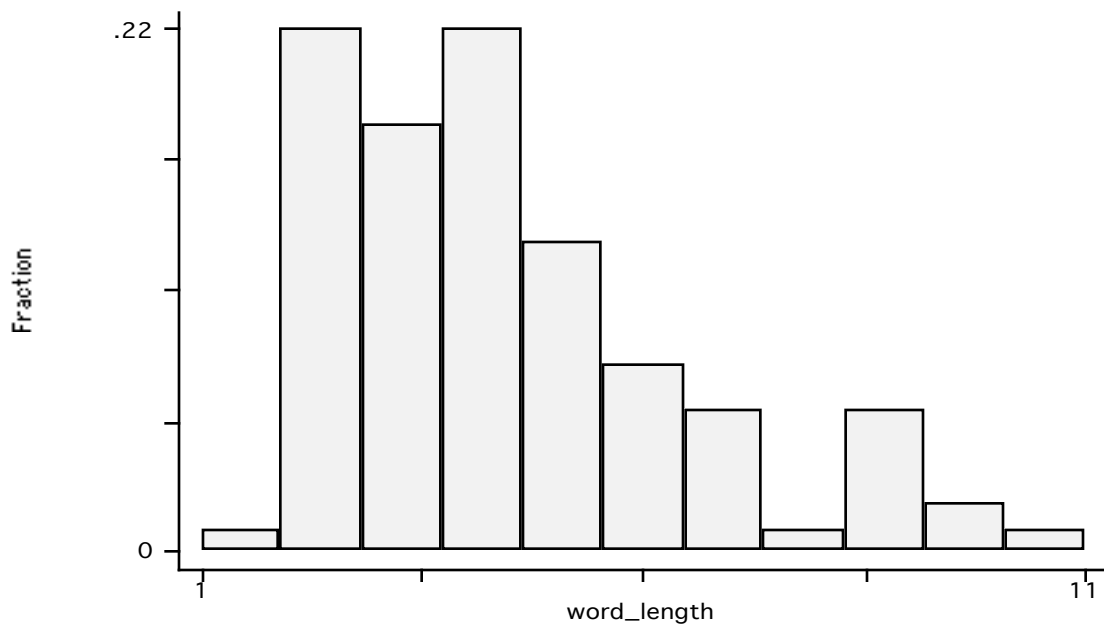Frequency Table:

```
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.