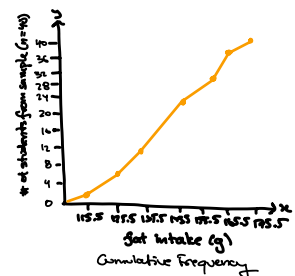
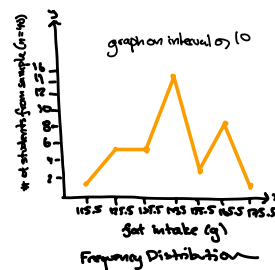


- ① a. Construct a frequency table by hand + plot  
b. Cumulative Frequency

Sturges Principle:  $1 + 3.3 \log(40) = \text{ceiling}(6.2) = 7 < \text{sm } n \rightarrow 120$   
 $\frac{P}{I} = \frac{174-170}{2} = 2.714 \Rightarrow \text{we round to } 10$

Class interval	Frequency	Cumulative Frequency
110-120	1	1
121-130	5	6
131-140	5	11
141-150	15	26
151-160	3	29
161-170	9	38
171-180	2	40

40



- ② For Cholesterol Zip File

- a. mean: 202.78  
 b. median: 196  
 c. mode: 205  
 d. range: 208  
 e. Standard dev: 42.98  
 f. Variance: 1847.24  
 g. 1<sup>st</sup> coefficient skew: 0.4736  
 h. 2<sup>nd</sup> coefficient skew: -0.521

Code:

```

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import statistics
import math

# Load the data
data = pd.read_csv('cholesterol.zip')

# Calculate the statistics
mean = data['cholesterol'].mean()
median = data['cholesterol'].median()
mode = data['cholesterol'].mode()[0]
range = data['cholesterol'].max() - data['cholesterol'].min()
std_dev = data['cholesterol'].std()
variance = data['cholesterol'].var()
skewness_1 = data['cholesterol'].skew()
skewness_2 = data['cholesterol'].kurtosis()

# Print the results
print(f"Mean: {mean}, Median: {median}, Mode: {mode}, Range: {range}, Std Dev: {std_dev}, Variance: {variance}, Skewness 1: {skewness_1}, Skewness 2: {skewness_2}")
    
```

- ③ Analyze pharmacokinetic parameters for women treated for anti-depressant  
 12 datapoints in kg: 62, 51, 56, 57, 67, 66, 60, 61, 58, 60, 49, 71

- a. mean: 59.833  
 b. median: 60.0  
 c. mode: 60.0  
 d. range: 22  
 e. variance: 36.805  
 f. std. dev.: 6.0667  
 g. 1<sup>st</sup> coef of var: -0.8241
- } calculated using the python code above

- ④ 10 people are selected to fill 5 vacancies, how many ways can the vacancies be filled?

$${}_{10}C_5 = \binom{10}{5} = \frac{10!}{5!(10-5)!} = \frac{10!}{5!(5!)} = \frac{3,628,800}{120(120)} = \boxed{252 \text{ ways to fill vacancy}}$$

- ⑤ Health Dept Receives 25 applicants. (10 > 30 y/o, 15 < 30 y/o), (17 = bachelor, 8 = grad), (6 => < 30 y/o and = grad). Prob person > 30 OR master's

$$P(\text{Person over 30} \mid \text{Master's}) = \frac{10}{25} + \frac{6}{25} = \boxed{\frac{16}{25}} = 0.64$$

⑥ From a group of 6 men + 5 women, 4 persons are selected such that half are women (2 of 4). In how many ways can this be done?

$${}_6C_2 = \frac{6!}{(6-2)! \cdot 2!} = \frac{720}{(24)(2)} = 15$$

$${}_5C_2 = \frac{5!}{(5-2)! \cdot 2!} = \frac{120}{6(2)} = 10$$

$${}_6C_2 * {}_5C_2 = 15 * 10 = \boxed{150 \text{ combinations}}$$

⑦ For Indigenous Maori People

$$P(\text{exposed to plant based allergen in reaction}) = 0.6$$

$$P(\text{allergic reaction} | \text{exposed}) = 0.8$$

$$P(\text{has been exposed to allergen}) = \frac{0.6}{0.8} \boxed{= 0.75}$$