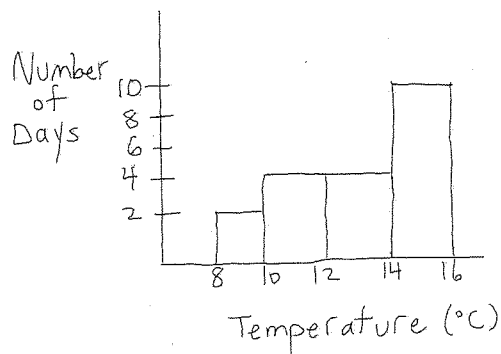


1. [3 marks] The temperature at noon (in °C) was recorded at a specific location on 20 different days.



a) State whether the data is symmetrical, skewed left or skewed right.

skewed left

b) State whether the data is unimodal or bimodal.

Unimodal

c) On what percentage of days was the temperature at noon between 8°C and 10°C?

$$\frac{2}{20} = 0.1 = 10\%$$

2. [3 marks] A population's mean is equal to 7 and its standard deviation is equal to 2. Find:

a) The new mean if we add 5 to every measurement.

$$7 + 5 = 12$$

b) The new standard deviation if we add 5 to every measurement.

$$2$$

c) The new mean if we multiply every measurement by 5.

$$7(5) = 35$$

3. [3 marks] Fifty students were polled on whether they like ^{walking} or not, and whether they like hiking or not. The number of students in each category appears below.

	Likes ^{walking}	Dislikes ^{walking}
Likes Hiking	28	7
Dislikes Hiking	4	11

Find the probability that:

a) a student dislikes ^{walking}

$$\frac{18}{50}$$

b) a student likes hiking and likes ^{walking}

$$\frac{28}{50}$$

c) a student likes hiking or likes ^{walking}

$$\frac{4+28+7}{50} = \frac{39}{50}$$

4. [2 marks] The population below has a mean of 17. Find x .

6, 21, x , 13

$$\mu = 17$$

$$\frac{6+21+x+13}{4} = 17$$

$$6+21+x+13 = 68$$

$$x+40 = 68$$

$$x = 28$$

5. [4 marks] A population has $\mu = 50$ and $\sigma = 8$. Find the range in which at least 93.75% of the measurements fall.

Tchebysheff

$$1 - \frac{1}{k^2} = 0.9375$$

$$0.0625 = \frac{1}{k^2}$$

$$0.0625 k^2 = 1$$

$$k^2 = \frac{1}{0.0625}$$

$$k = \sqrt{\frac{1}{0.0625}} = 4$$

$$\mu - k\sigma \leq x \leq \mu + k\sigma$$
$$50 - 4(8) \leq x \leq 50 + 4(8)$$

$$18 \leq x \leq 82$$

6. [4 marks] A population has $\mu = 60$ and $\sigma = 6$ and the population is mound-shaped. Approximately what percentage of measurements fall in the range $54 \leq x \leq 66$?

Empirical

$$\mu + k\sigma = 66$$

$$60 + k(6) = 66$$

$$k(6) = 6$$

$$k = 1$$

The range is $\mu - k\sigma \leq x \leq \mu + k\sigma$
 $\mu - \sigma \leq x \leq \mu + \sigma$

Approximately 68%

7. [3 marks] Alice ran two races this year. For each race the following data is provided: Alice's time, the mean of all the runners' times, and the standard deviation of all the runners' times (all measured in minutes).

	Alice's Time	μ	σ
Race 1	55	70	5
Race 2	27	35	4

a) Calculate Alice's z-score for Race 1.

$$z = \frac{x - \mu}{\sigma} = \frac{55 - 70}{5} = -3$$

b) Calculate Alice's z-score for Race 2.

$$z = \frac{x - \mu}{\sigma} = \frac{27 - 35}{4} = -2$$

c) In which race did Alice have the fastest time relative to the other runners?

Fastest time
 \Rightarrow Smallest time
 \Rightarrow Smallest z-score
Race 1

8. [4 marks] How many four-character case-sensitive alphanumeric passwords contain at least one number?

Case-sensitive alphanumeric: 0, ..., 9, ..., Z, A, ..., z
 62 symbols

$$\text{Total \# of passwords} = 62^4$$

$$\text{\# of passwords with no numbers} = 52^4$$

$$\text{\# of passwords with at least one number}$$

$$= 62^4 - 52^4$$

$$= 7,464,720$$