# 2.3 A review of Set Notation

From a dataset of 1800 individuals compiling Fitness tracker data, 60 were randomly picked and it was found that 9 were engaging in HIIT training, 36 where Male, and 3 were Males that were engaging in HIIT training. Find the number of individuals who were Females and not engaging in HIIT training.

A: 24 out of the 60 picked are Female and 51 individuals were not engaging in HIIT training. 24 – 6 = 18 females are not engaging in HIIT training.

# 2.4 A Probabilistic Model for an Experiment: The Discrete Case

The resting heart rate of individuals going to the gym is between 50 – 57, 57 – 64, 64 – 69, or 69 – 74 at proportions .27, .23, .25, .25 respectively. A single individual is chosen at random from the population.

1. List the sample space for this experiment
   1. S = {50 –57, 57-64, 64-69, 69-74}
2. Make use of the information given above to assign probabilities to each of the simple events.
   1. 50 – 57 = 27%
   2. 57 – 64 = 23%
   3. 64 – 69 = 25%
   4. 69 – 74 = 25%
3. What is the probability that the person chosen at random has a resting heart rate between 50 to 57 or 69 – 74
   1. 52%

# 2.6 Tools for Counting Sample Points

There are 4 types of workouts you can prioritize at the gym, Strength training, Cardio, Yoga, HIIT or taking a rest day. Assuming you only have the time for one type of workout each day (rest is considered a training day) how many different arrangements can you make to fit 1 of each type of workout and 2 training days in a week

1. = 21

# 2.7 Conditional Probability and the Independence of Events

The local gym wishes to figure out how types of training relate with session duration. Specifically looking at strength training the gym wishes to find out if this type of training leads to longer session times. What is the conditional probability that a member’s session time is greater than a hour, given that they are performing strength training?

A) .862 = 86.21%

# 2.8 Two Laws of Probability

The probability that a gym member performs cardio training during a session is 0.24

The probability that A gym members weight is being between 40 – 76kg is 0.66

What is the probability of these events both occurring if they were independent? What if they were Dependent?

1. P(A∩B) = 15.84%
2. P(A∩B) = 18%

# 3.2 The Probability Distribution for a Discrete Random Variable

A gym is tracking the age of members who workout during the week. The age of members is given below

|  |  |
| --- | --- |
| X(age) |  |
| 18-22 | .13 |
| 22-26 | .09 |
| 26-30 | .09 |
| 30-34 | .09 |
| 34-38 | .08 |
| 38-42 | .10 |
| 42-46 | .10 |
| 46-50 | .10 |
| 50-54 | .11 |
| 54-59 | .11 |

What is the expected age range of a gym member?

1. E(X) = 4.53

# 3.4 Binomial Probability Distribution

In a survey it was concluded that 30% of gym goers admit that they do not follow a given gym program correctly. Say we grab 5 random members, what is the probability 3 out of 5 of them correctly follow their routine?

1. Theres a 30.87% chance that 3 out of 5 randomly chosen gym goers follow their routine.

# 3.5 Geometric Probability Distribution

The gym has started offering new fitness classes for current members. The probability that any given member will attend these classes is 0.15. The gym wants the know the odds that a given member will attend the class on the third day that the class is.

1. P(X = 3) = (1 – 0.15 \* 0.15 = 10.84%

# 3.6 Negative Binomial Probability and Distribution

A gym trainer is trying to start a new HIIT program. The probability that any member agrees to join is 0.2. What is the probability that he has to approach 8 members to achieve 3 people joining his class?

P(X = 8) = 0.055 = 5.5%

# 3.7 Hypergeometric Probability Distribution

A random population of 20 gym goers has been selected. It was found that 8 members attend strength training classes regularly while 12 do not. Out of these 20, 5 are selected randomly to participate in a survey. What is the probability that exactly 3 members of the 5 in the group train strength regularly?

1. P(X = 3) = 0.238 = 23.8%

# 3.8 Poisson Distribution

On average 3 members sign up for the new HIIT program every hour, what is the probability 5 members will sign up for the class in the next hour?

1. P(X = 5) = 0.108 = 10.8%

# 4.2 The Probability Distribution for a Continuous Random Variable

A gym tracks the BMI of its members as shown in the distribution function below. Find the probability function.