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# Question 1 - Basic Math

# Part a - Function to compute the log of a positive number

log(64)

# Part b -  What is the default base for the log function?

log(x,base)

# Part c - the log of a negative number

# The real logarithm is undefined for negative real numbers produces a NAN

log(-15)

# Part d - the square-root of a positive number

sqrt(25)


# Question 2 - Random Number Generation

# Part a - Create a vector of 15 standard normal random

# variables calculate its mean and SD (Standard Deviation)

random_vector <- rnorm(15)

random_vector

mean(random_vector)

 sd(random_vector)


# Part b - Change the mean to 10 and the SD to 2 to recalculate

# the vector of 15 random normal variables. Calculate its mean

# and SD

random_vector <- rnorm(15, m = 10, sd = 2)

random_vector

mean(random_vector)
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sd(random_vector)

# Because they are both random generated and your

# changing the mean of the 2nd one produced random numbers around

# that  2nd  mean.



# Question 3 - Vector Operations

# Part a -- c - Create 2 vectors for heights and weights of 6 individuals

weights <- c(60, 72, 57, 90, 95, 72)

heights <- c(1.80, 1.85, 1.72, 1.90, 1.74, 1.91)


# Part d - Create a scatterplot of weight vs. height

# Interpret the scatterplot

plot(heights,

    weights,

    main = "Weight versus Height for 6 Individuals",

    xlab = "Height (m)",

    ylab = "Weight (kg)")

# height and weight are positively correlated, except

# for a shorter individual who weighs the most.


# Part e - Calculate the BMI for each individual

# BMI = weight in kg divided by the square of the height in m

BMI <- weights / (heights ^ 2)

BMI
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# Part f - Calculate the mean for weight

mean_weight <- mean(weights)

mean_weight


# Part g - Subtract the mean for each value of weight

weight_difference <- weights - mean_weight

weight_difference


# part h - Sum the result

# Now you know why we square the deviations from the mean to calculate a

# standard deviation!

sum_of_weight_difference <- sum(weight_difference)

sum_of_weight_difference


# Question 4 - Enter your data science profile in R as a data frame

# Data frame consists of two columns - data science categories, ranking

# Categories - Computer Programming, math, statistics, machine learning, domain

# expertise, communication and presentation skills, and data visualization

# Ranking - 1 as worst, 5 as best for best ranking for each category

# Create a bargraph of your data science profile


Data_Science_Categories <- c("Computer Programming", "Math", "Statistics", "Machine Learning",
"Domain Expertise", "Communication & Presentation Skills", "Data Visualization")

Ranking <- c(4,4,3,2,1,2,3)

che <- data.frame(Data_Science_Categories, Ranking)
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#Setting margin settings

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par(mar=c(11,4,4,4))
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make category names fit under the columns with cex.names and las

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barplot(che$Ranking, main="Data Science Ranking", names.arg=che$Data_Science_Categories, ylab="Rankings", las=2, cex.names=.6)
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