Homework 1
of
STAT 3355 Introduction to Data Analysis

Problem 1

Find the numeric answers of the following mathematical expressions (up to 2 decimal places if the answer is not an integer).

(a) $8 + 9 - 7/3^{0.3}$

   Answer: Remember the order of operations rules!

(b) $\log_2\left(\sqrt{(15 + 16)/(14 + 12)}\right)$

   Answer:

   After rounding, the answer becomes 0.09

(c) $\left(\dfrac{11 + \sin(\pi/4)}{3! + |-10|}\right)^2$

   Answer:

(d) $6 + 5 - 4/3^2$

   Answer:

(e) $\exp\left(\sqrt{(14 + 13)/(12 + 11)}\right)$

   Answer:

(f) $\left(\frac{11+12!}{13!+14}\right)^2$

Answer:

Problem 2

The monthly rainfall (inches) in Richardson, Texas can be seen on this website: U.S. Climate Data. The data is also provided here for your convenience:

$$2.60, 3.05, 3.74, 3.48, 5.49, 4.25, 2.57, 2.18, 3.14, 4.82, 3.28, 3.01$$

Please answer the following questions.

(a) Enter this data into a data vector called RF

Answer:

(b) Name the data vector with the month abbreviation

Answer:

(c) What is the average rainfall in inches during a year (round to two decimal places)?

Answer:

(d) Find the month with the minimum rainfall and the month with maximum rainfall.

Answer:

Problem 3

The monthly sales figures of Hummer H2 vehicles in the U.S. during 2002 were 2700, 2600, 3050, 2900, 3000, 2500, 2600, 3000, 2800, 3200 2800 3400. Please answer the following questions.

(a) Enter this data into a data vector called H2

Answer:

(b) Name the data vector with the month abbreviation

Answer:

(c) What is the total number of Hummer H2 sold in 2002?

Answer:

(d) Using `diff()`, find the month with the greatest increase from the previous month, and the month with the greatest decrease from the previous month

Answer:

Problem 4

Rewrite each code block to comply with the "Homework and Project Code Style Guide"

(a)

```r
x <- c( 1,-2,3,-4,5,100 )
y   <- x* - 1
y[ y>0 ]
```

Answer:

(b)

```r
# create a sequence from 1 to 50
z <- seq(1:50)

# test whether an observation is even
even <- z%%2 = = 0

# subset z by the test above
z = z [even]
```

Answer:

```r
# Create a sequence from 1 to 50



# Test whether an observation is even

# Subset z by the test above

```

(c)

```r
mean <- function(x) {
sum(x)/length(x)
}
```

Answer:

Problem 5

A perfect square number is defined as an integer whose square root is also integer (the square root function only accepts positive numbers). For example, 25 is a perfect square number because $\sqrt{25} = 5$. Make a function called `PrintSquare()` that goes through all the integers from 1 to 1000 (included) and prints out all the perfect square numbers.

Answer:

Problem 6

A twin prime is a prime that has a prime gap of two. Sometimes the term twin prime is used for a pair of twin primes. For example, the five twin prime pairs are $(3, 5)$, $(5, 7)$, $(11, 13)$, $(17, 19)$ and $(29, 31)$. Write a function that returns the number of all twin prime pairs between 1 and a given number n.

Answer: