

Homework 1

Suresh L. Paul

2023-10-16

Calculate the following:

- $543 + 87655$
 - $(3215 + 23) / 42$
 - 3^5
 - $45 \% \% 7$
 - `body_mass_index <- weight_in_kgs / (height_in_meters ^ 2)` when weight is 75 kilograms and height is 1.70 meters
-

Find `u`

given,

```
p <- 145  
q <- 212  
r <- 56
```

and

```
u <- c(p, q, r)
```

Also calculate

```
u <- c(u, u, u, u)  
  
sum(u)  
  
mean(u)  
  
min(u)  
  
max(u)  
  
sd(u)
```

find class and typeof for the following variables:

```
numeric_var <- 78  
character_var <- "Bloomberg Research Center"  
logical_var <- TRUE  
evenNumbers <- c(2, 4, 6, 8, 10, 12, 14, 16, 20)  
zero <- 0  
pi <- 3.141593  
powersOfTen <- c(1, 10, 100, 1000, 10000, 100000)
```

vectors

Consider the following vectors:

```
a <- 17  
b <- 6
```

Use the elementary arithmetic operators $+$, $-$, $*$, $/$, and $^$ to:

- a) add a and b
 - b) subtract b from a
 - c) multiply a by b
 - d) divide a by b
 - e) raise a to the power of b
-

Consider the following vectors:

```
a <- c(1, 3, 5, 7, 9)  
b <- c(2, 4, 6, 8, 10)
```

Find the following:

- a) add a and b
- b) subtract b from a
- c) multiply a by b

- d) divide a by b
 - e) raise a to the power of b
 - f) $(13 * a + b) / 10$
 - g) $(a + 0.15 * b)^2$
 - h) $(a + 21) * (a - 9) + b$
-

Mortgage payment

Consider the following formula to calculate the number of mortgage payment terms:

$$n = \frac{\ln\left(\frac{i}{\frac{M}{P} - i} + 1\right)}{\ln(1 + i)}$$

In this equation, M represents the monthly payment amount, P the principle, and i the (monthly) interest rate.

Figure 1: Formula for calculation number of periods - n

- Calculate the number of payment terms n for a mortgage with a principle balance P of \$380,000, monthly interest rate i of 0.54%, and monthly payment amount M of 1850.
- What if all else is the same (no change in other variables) but monthly payments M is now given as a vector

```
c(1100, 1200, 1300, 1400, 1500, 1600, 1700, 1800, 1900, 2000)
```

?

Consider the *mtcars* in-built dataset. Do the following:

- load
 - read the help
 - head
 - tail
 - str
-