Lab Assignment 1

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Section 1

Calculate the solution to the following five exercises.

Q1:

$$3 \times 4 + 7 - 8 \div 13$$

```
3 * 4 + 7 - 8 / 13
```

```
[1] 18.38462
```

Q2:

$$e^{-3}$$

```
exp(-3)
```

```
[1] 0.04978707
```

Q3:

$$\sqrt[4]{100}$$

```
100^(1/4)
```

```
[1] 3.162278
```

Q4:

$$log_e(15.8)$$

```
log(15.8)
```

```
[1] 2.76001
```

Q5:

$$\sin\left(\frac{\pi}{6}\right)$$

```
sin(pi / 6)
```

```
[1] 0.5
```

Section 2

Why would the code produce an error?

x = 3

y = 2

x + Y

The code produces an error because R is case-sensitive, and the variable 'Y' is not defined. The correct variable name should be 'y' (lowercase) instead of 'Y' (uppercase). Therefore, the expression should be 'x + y' to avoid the error. Code can be fixed by defining both variables or matching the case of the variables.

fixed code

```
x=3
y=2
x+y
```

```
[1] 5
```

Section 3

Create a vector of the sequence of values 3,5,7,...,19,21

```
vec <- seq(3, 21, by = 2)
vec
```

```
 [1]  3  5  7  9 11 13 15 17 19 21
```

Section 4

Determine if the values in the lab_vector variable are numeric

```
lab_vector <- c(3, 6, 3.141592654, 3 + 4i)
lab_vector
```

```
[1] 3.000000+0i 6.000000+0i 3.141593+0i 3.000000+4i
```

```
is.numeric(lab_vector)
```

```
[1] FALSE
```

what does data type does the code `3 + 4i` produce?

```
typeof(3 + 4i)
```

```
[1] "complex"
```

The code `3 + 4i` produces a complex number data type in R. The 'i' denotes the imaginary unit, so `3 + 4i` represents a complex number with a real part of 3 and an imaginary part of 4.

Section 5

Create a vector of 100 values assigned to the variable `height` that rounds the values to one decimal place and is taken from a normal distribution with a mean $\mu = 172$, and a standard deviation, $\sigma = 10$.

```
set.seed(123)  # Setting seed for reproducibility
height <- round(rnorm(100, mean = 172, sd = 10), 1)
height
```

```
  [1] 166.4 169.7 187.6 172.7 173.3 189.2 176.6 159.3 165.1 167.5 184.2 175.6
 [13] 176.0 173.1 166.4 189.9 177.0 152.3 179.0 167.3 161.3 169.8 161.7 164.7
```

```
[25] 165.7 155.1 180.4 173.5 160.6 184.5 176.3 169.0 181.0 180.8 180.2 178.9
[37] 177.5 171.4 168.9 168.2 165.1 169.9 159.3 193.7 184.1 160.8 168.0 167.3
[49] 179.8 171.2 174.5 171.7 171.6 185.7 169.7 187.2 156.5 177.8 173.2 174.2
[61] 175.8 167.0 168.7 161.8 161.3 175.0 176.5 172.5 181.2 192.5 167.1 148.9
[73] 182.1 164.9 165.1 182.3 169.2 159.8 173.8 170.6 172.1 175.9 168.3 178.4
[85] 169.8 175.3 183.0 176.4 168.7 183.5 181.9 177.5 174.4 165.7 185.6 166.0
[97] 193.9 187.3 169.6 161.7
```