

STAT3355(HW-1)

Tulasi Janjanam

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Problem 1

(a)

```
result <- 8 + 9 - 7/3^0.3  
round(result, 2)
```

```
## [1] 11.97
```

(b)

```
result <- log2(sqrt((15 + 16) / (14 + 12)))  
round(result, 2)
```

```
## [1] 0.13
```

(c)

```
result <- ((11 + sin(pi / 4)) / (factorial(3) + abs(-10)))^2  
round(result, 2)
```

```
## [1] 0.54
```

(d)

```
result <- 6 + 5 - (4 / (3^2))  
round(result, 2)
```

```
## [1] 10.56
```

(e)

```
result <- exp(sqrt(14 + 13) / (12 + 11))  
round(result, 2)
```

```
## [1] 1.25
```

(f)

```
result <- ((11 + factorial(12)) / (factorial(13) + 14))^2
round(result, 2)
```

```
## [1] 0.01
```

Problem 2

(a) Monthly rainfall data

```
RF <- c(2.60, 3.05, 3.74, 3.48, 5.49, 4.25, 2.57, 2.18, 3.14, 4.82, 3.28, 3.01)
```

(b) Assigning month abbreviations

```
names(RF) <- c("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Jul", "Aug", "Sep", "Oct", "Nov", "Dec")
```

(c) Finding average

```
average_rainfall <- mean(RF)
round(average_rainfall, 2)
```

```
## [1] 3.47
```

(d) Min & max months

```
min_month <- names(RF)[which.min(RF)]
max_month <- names(RF)[which.max(RF)]
```

```
min_month
```

```
## [1] "Aug"
```

```
max_month
```

```
## [1] "May"
```

Problem 3

(a)

```
H2 <- c(2700, 2600, 3050, 2900, 3000, 2500, 2600, 3000, 2800, 3200, 2800, 3400)
```

(b)

```
names(H2) <- c("Jan", "Feb", "Mar", "Apr", "May", "Jun", "Jul", "Aug", "Sep", "Oct", "Nov", "Dec")
```

(c)

```
total_sales <- sum(H2)
total_sales
```

```
## [1] 34550
```

(d)

```
sales_diff <- diff(H2)

max_increase_month <- names(H2)[which.max(sales_diff) + 1]
max_decrease_month <- names(H2)[which.min(sales_diff) + 1]

list(
  max_increase_month = max_increase_month,
  max_decrease_month = max_decrease_month
)
```

```
## $max_increase_month
## [1] "Dec"
##
## $max_decrease_month
## [1] "Jun"
```

Problem 4

(a)

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

```
## [1] 2 4
```

(b)

```
z <- seq(1,50)
even <- z %%2 == 0
z = z[even]
```

(c)

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

Problem 5

```
PrintSquare <- function(x){
  for (i in 1:1000) {

    if (sqrt(i) %% 1 == 0) {
      print(i)
    }
  }
}

PrintSquare()
```

```
## [1] 1
## [1] 4
## [1] 9
## [1] 16
## [1] 25
## [1] 36
## [1] 49
## [1] 64
## [1] 81
## [1] 100
## [1] 121
## [1] 144
## [1] 169
## [1] 196
## [1] 225
## [1] 256
## [1] 289
## [1] 324
## [1] 361
## [1] 400
## [1] 441
## [1] 484
## [1] 529
## [1] 576
## [1] 625
## [1] 676
## [1] 729
## [1] 784
## [1] 841
## [1] 900
## [1] 961
```

Problem 6

```
is_prime <- function(x) {
  if (x <= 1) return(FALSE)
  if (x == 2) return(TRUE)
  if (x %% 2 == 0) return(FALSE)
  for (i in 2:sqrt(x)) {
    if (x %% i == 0) return(FALSE)
  }
}
```

```

    }
    return(TRUE)
}

print_twin_primes <- function(n) {
  if (n < 2) {
    cat("No twin primes below 3\n")
    return()
  }

  for (i in 2:(n - 2)) {
    if (is_prime(i) && is_prime(i + 2)) {
      cat("(", i, ", ", i + 2, ")\n", sep = "")
    }
  }
}

n <- 100
print_twin_primes(n)

```

```

## (3, 5)
## (5, 7)
## (11, 13)
## (17, 19)
## (29, 31)
## (41, 43)
## (59, 61)
## (71, 73)

```