

STAT 3355 HW1

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Problem 1

(a)

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

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

(b)

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

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

(c)

```
x <- (11 + sin(pi / 4))  
y <- (factorial(3) + abs(-11))  
z <- x / y  
round(z ^ 2, digits <- 2)
```

```
## [1] 0.47
```

(d)

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

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

(e)

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

```
## [1] 2.95
```

(f)

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

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

Problem 2

(a) Putting data into data vector RF

```
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) Renaming RF to mon

```
mon <- RF
```

(c) Average rainfall during the year

```
round(mean(mon), digits <- 2)
```

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

(d) Finding months with minimum and maximum rainfall

```
which.min(mon)
```

```
## [1] 8
```

```
which.max(mon)
```

```
## [1] 5
```

Problem 3

(a) Putting data in vector HF

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

(b) Renaming vector to mon

```
mon <- H2
```

(c) Total Hummers sold in 2002

```
sum(mon)
```

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

(d) Finding greatest increase in decrease

```
# Greatest increase within a month
monthly_difference <- diff(mon)
monthly_increase <- which.max(monthly_difference)
greatest_increase <- monthly_increase + 1
print(greatest_increase)
```

```
## [1] 12
```

```
# Greatest decrease within a month
monthly_decrease <- which.min(monthly_difference)
greatest_decrease <- monthly_decrease + 1
print(greatest_decrease)
```

```
## [1] 6
```

Problem 4

(a)

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

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

(b)

```
# 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]
```

(c)

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

Problem 5

Find perfect squares

```
PrintSquare <- function() {  
  for (num in 1:1000) {  
    if (sqrt(num) == as.integer(sqrt(num))) {  
      print(num)  
    }  
  }  
}
```

```
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

Find twin primes

```
prime <- function(num) {  
  if (num <= 1) {  
    return(FALSE)  
  }  
  for (i in 2:(sqrt(num))) {  
    if (num %% i == 0) {  
      return(FALSE)  
    }  
  }  
  return(TRUE)  
}  
  
twin_primes <- function(n) {  
  twin_primes_num <- 0  
  
  for (num in 1 : (n - 2)) {  
    if (prime(num) && prime(num + 2)) {  
      twin_primes_num <- twin_primes_num + 1  
    }  
  }  
  
  return(twin_primes_num)  
}  
  
#n <- readline(prompt <- "Enter a number")  
#n <- as.numeric(n)  
#print(twin_primes(n))  
  
# Example Output  
n <- 50  
print(twin_primes(n))
```

```
## [1] 6
```