

# hw\_1

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## Question 1(a)

```
divide <- function(d,a) {  
  if (a==0) stop("division by zero is undefined.")  
  if (d<0 || a<0) stop("divide() only works for positive 'a' and 'd'.")  
  quotient <- 0  
  for (i in 1:d) {  
    if (a <=d){  
      d = d - a  
      quotient = quotient + 1  
    }  
  }  
  c(q = quotient, r = d)  
}  
divide(22, 7)
```

```
## q r  
## 3 1
```

```
22 %/% 7
```

```
## [1] 3
```

```
22 %% 7
```

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

```
divide(22, 0)
```

```
## Error in divide(22, 0): division by zero is undefined.
```

```
divide(-22,7)
```

```
## Error in divide(-22, 7): divide() only works for positive 'a' and 'd'.
```

```
divide(21,7)
```

```
## q r  
## 3 0
```

## Question 1(b)

```
mod <- function(d,a) {  
  a<- divide(d,a)  
  unname(a[2])  
}
```

```
}  
mod(23, 7)
```

```
## [1] 2  
mod(21,7)
```

```
## [1] 0
```

Question 1(c)

Question 1(d)

Question 2(a)

```
inv <- function(b, x0 = 10^-(ceiling(log10(abs(b)))), tol = sqrt(.Machine$double.eps),  
               message = FALSE) {  
  dif <- 100  
  while (dif > tol){  
    y <- x0  
    x0 <- x0 * (2 - b * x0)  
    dif <- x0 - y  
    if (message) print(x0)  
  }  
  x0  
}
```

```
inv(1000, message = TRUE)
```

```
## [1] 0.001
```

```
## [1] 0.001
```