Tutorial 1 sample answer

Question 1

a)	`> 12.3+232.2` `[1] 244.5`
b)	`> log(exp(2)+3)` `[1] 2.340753`
c)	`> sin(pi/4+3)` `[1] -0.6002435`
d)	`> atan(1.3^2)` `[1] 1.03649`

Question 2

a)	`> x <- 2.3 # or x <- 2.3`
	`> y <- 3.1`
	`> sqrt(x^4-5*y)`
	`[1] 3.533285`

b)	`> exp(x) - 3*x + y^x` `[1] 16.56791`
c)	`> acos(x/y)` `[1] 0.7348438`

d)	`> z <- x^2 - log(10*y)`
	`> log(z+3/z)`
	`[1] 1.244841`

Question 3

a)	`> x <- 2.3`
	`> y <- 3.1`
	`> 3*x > 2*y`
	`[1] TRUE`

b)	`> (x^y <= y^x) & (3^x > y^2.2)` `[1] TRUE`
c)	`> (cos(x) == 0) | (sin(y)>0)` `[1] TRUE`

Question 4

a)	`> x <- c(6,4,3,20)`
	`> y <- c(12,46,2,1)`
	`> x + 2*y`
	`[1] 30 96  7 22`

b)	`> sum(x*y)` `[1] 282`

c)	`> max(z)`
	`[1] 390`
	`> which.max(z)`
	`[1] 4`
	
	The fourth component is the maximum of *z*.

d)	`> y[y>10]` `[1] 12 46`

e)	`> c(x,y)`
	`[1]  6  4  3 20 12 46  2  1`
	
	It combines the vector *x* and *y* into one vector.

f)	`> sum(x[x>5])`
	`[1] 26`
	
	It calculates the sum of *x* with values greater than 5.

g)	`> sum(x>5)`
	`[1] 2`
	
	The code calculates the number of component in *x* with values greater than 5.

Question 5

a)	`> -10:10`
	`#or`
	`> seq(from=-10, to=10, by=1(`

b)	`> seq(from=0, to=100, length.out=1000)`

c)	`> rep(0, 10)`
	`#or`
	`> vector("numeric", 10)`

d)	`> rep(c("A", "B", "C"), times=3)`

e)	`> rep(c("A", "B", "C"), each=3)`

Question 6

a)	`> A <- matrix(c(21,3,2,14), ncol=2, byrow=TRUE)`
	`> B <- matrix(c(12,5,45,1), ncol=2, byrow=TRUE)`
	`> class(A)`
	`[1] "matrix" "array"`

b)	`> A+B`
	`     [,1] [,2]`
	`[1,]   33    8`
	`[2,]   47   15`

c)	`> A %*% B`
	`     [,1] [,2]`
	`[1,]  387  108`
	`[2,]  654   24`

d)	`> solve(A)`
	`              [,1]         [,2]`
	`[1,]  0.048611111 -0.01041667`
	`[2,] -0.006944444  0.07291667`

e)	`> solve(t(A) %*% B)`
	`               [,1]          [,2]`
	`[1,] -0.0004727439  0.001744262`
	`[2,]  0.0108568075 -0.005575117`

Question 7

a)	`> D <- matrix(c(3,52,7,2,10,1), nrow=2, byrow=TRUE)`
	`> x <- matrix(c(75,2),nrow=2)`
	`> E <- cbind(D,x)`

b)	`> F <- D[,c(1,2)]`