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### LAB 1 - R introduction ###

# Question 1 #
> a = 2.3
> formula = (6*a + 42)/(3^(4.2-3.62))
> formula
[1] 29.50556


# Question 2 #
> (-4)^2+2
[1] 18


# Question 3 #
> ex3 = c(25.2,15,16.44,15.3,18.6)
> mean(ex3)
[1] 18.108


# Question 4 #
> x = log(0.3)
> x1 = logb(0.3,base = exp(1)) # another way
> x
[1] -1.203973
> x1
[1] -1.203973


# Question 5 #
> exp(x)
[1] 0.3


# Question 6 #
> -0.00000000423546322
[1] -4.235463e-09


# Question 7 #
# a #
> a = (3^3) * (4^(1/8))
> a
[1] 32.10859
# b #
> a = a/2.33
> a
[1] 13.78051
# c #
> c = (-8.2)*(10^(-13))
> c
[1] -8.2e-13
# d #
> a*c
[1] -1.130002e-11

# Question 8 #
> ex8 = rev(seq(-11,5,0.3))
> ex8
```

```
  [1]    4.9    4.6    4.3    4.0    3.7    3.4    3.1    2.8    2.5    2.2    1.9    1.6
1.3
 [14]    1.0    0.7    0.4    0.1   -0.2   -0.5   -0.8   -1.1   -1.4   -1.7   -2.0   -2.3
-2.6
 [27]   -2.9   -3.2   -3.5   -3.8   -4.1   -4.4   -4.7   -5.0   -5.3   -5.6   -5.9   -6.2
-6.5
 [40]   -6.8   -7.1   -7.4   -7.7   -8.0   -8.3   -8.6   -8.9   -9.2   -9.5   -9.8  -10.1
-10.4
 [53]  -10.7  -11.0
  [1]    4.9    4.6    4.3    4.0    3.7    3.4    3.1    2.8    2.5    2.2    1.9    1.6
1.3
 [14]    1.0    0.7    0.4    0.1   -0.2   -0.5   -0.8   -1.1   -1.4   -1.7   -2.0   -2.3
-2.6
 [27]   -2.9   -3.2   -3.5   -3.8   -4.1   -4.4   -4.7   -5.0   -5.3   -5.6   -5.9   -6.2
-6.5
 [40]   -6.8   -7.1   -7.4   -7.7   -8.0   -8.3   -8.6   -8.9   -9.2   -9.5   -9.8  -10.1
-10.4
 [53]  -10.7  -11.0


# Question 9 #
> ex8 = rev(ex8)
> ex8
  [1] -11.0 -10.7 -10.4 -10.1  -9.8  -9.5  -9.2  -8.9  -8.6  -8.3  -8.0  -7.7
-7.4
 [14]  -7.1  -6.8  -6.5  -6.2  -5.9  -5.6  -5.3  -5.0  -4.7  -4.4  -4.1  -3.8
-3.5
 [27]  -3.2  -2.9  -2.6  -2.3  -2.0  -1.7  -1.4  -1.1  -0.8  -0.5  -0.2   0.1
0.4
 [40]   0.7   1.0   1.3   1.6   1.9   2.2   2.5   2.8   3.1   3.4   3.7   4.0
4.3
 [53]   4.6   4.9


# Question 10 #
> ex10a = seq(6,12)
> ex10b = rep(5.3,3)
> ex10c = rep(-3,1)
> ex10d = seq(102,206, length.out=9)
> ex10a
[1]   6   7   8   9  10  11  12
> ex10b
[1] 5.3 5.3 5.3
> ex10c
[1] -3
> ex10d
[1] 102 115 128 141 154 167 180 193 206


# Question 11 #
> ex11 = c(ex10a, ex10b, ex10c, ex10d)
> length(ex11)
[1] 20


# Question 12 #
> ex12 =c(6,9,7,3,6,7,9,6,3,6,6,7,1,9,1)
# a #
> ex12[ex12==6]
[1] 6 6 6 6 6
# b #
> ex12[ex12>=6]
 [1] 6 9 7 6 7 9 6 6 6 7 9
```

```
# c #
> ex12[ex12<(6+2)]
 [1] 6 7 3 6 7 6 3 6 6 7 1 1
# d #
> ex12[ex12!=6]
 [1] 9 7 3 7 9 3 7 1 9 1


# Question 13 #
> ex13 = ex12[-1:-3]
> ex12
 [1] 6 9 7 3 6 7 9 6 3 6 6 7 1 9 1
> ex13
 [1] 3 6 7 9 6 3 6 6 7 1 9 1
> M13 = matrix(ex13, nrow = 3 , ncol = 4)
# a #
> M13[2,2]
[1] 6
# b #
> sum(M13[,3])
[1] 19
> M13
     [,1] [,2] [,3] [,4]
[1,]    3    9    6    1
[2,]    6    6    6    9
[3,]    7    3    7    1


# Question 14 #
> Person = c("Stan","Francine", "Steve", "Roger", "Hayley", "Klaus")
> Sex = c("M","F", "M", "M", "F", "M")
> Age = c(41, 41, 15,1600,21,60 )
> df14 = data.frame(Person,Sex,Age)
> Avg_Age = mean(df14$Age)
> Avg_Age
[1] 296.3333


# Remove impossible Ages
> df14$Age[df14$Age > 150] <- NA
> df14
    Person Sex Age
1     Stan   M   41
2 Francine   F   41
3    Steve   M   15
4    Roger   M   NA
5   Hayley   F   21
6    Klaus   M   60
> Avg_Age = mean(df14$Age)
> Avg_Age
[1] NA
> Avg_Age = mean(df14$Age, na.rm = TRUE)
> Avg_Age
[1] 35.6
```