IST3110 - Week 1 Lab Session 1

1. Let's use R as a fancy calculator.
   - Find the natural log of 12.43.
   - Find the log to the base 10 of 12.43.
   - Find the log to the base 2 of 12.43.
   - Find the square root of 12.43.
   - Find the natural antilog (exponential) of 12.43.
2. Use R to determine the area of a circle with a diameter of 20 cm and assign the result to an object called `area_circle`. R already knows about `pi`.
3. Calculate the cube root of 14×0.51.

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4. Create a vector called `weight` with the following entries

   69 62 57 59 59 64 56 66 67 66

5. Extract the weights for the first five children using and store these weights in a new variable called `first_five`.
6. Create a vector called `height` with the following entries

   112 102 83 84 99 90 77 112 133 112

7. Extract all the heights of children less than or equal to 99 cm and assign to a variable called `shorter_child`
8. Use the information in your `weight` and `height` variables to calculate the body mass index (BMI) for each child. The BMI is calculated as weight (in kg) divided by the square of the height (in meters). Store the results of this calculation in a variable called `bmi`.

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9. Use the `seq()` function to create a sequence of numbers ranging from 0 to 1 in steps of 0.1 (this is also a vector by the way) and assign this sequence to a variable called seq1.
10. Next, see if you can figure out how to create a sequence from 10 to 1 in steps of 0.5. Assign this sequence to a variable called `seq2` (Hint: you may find it useful to include the `rev()` function in your code).
11. Let's go mad! Generate the following sequences. You will need to experiment with the arguments to the `rep()` function to generate these sequences
    - 1 2 3 1 2 3 1 2 3
    - "a" "a" "a" "c" "c" "c" "e" "e" "e" "g" "g" "g"
    - "a" "c" "e" "g" "a" "c" "e" "g" "a" "c" "e" "g"
    - 1 1 1 2 2 2 3 3 3 1 1 1 2 2 2 3 3 3
    - 1 1 1 1 1 2 2 2 2 3 3 3 4 4 5
    - 4 sevens, 3 twos, 1 eight and 5 ones

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12. Create a vector x with the following entries

    2 5 3 1 2 1 2 2 4 1 1 3 1 2 1 3 4 5 5 2

13. Check which elements of x are equal to 2.
    (Hint use == operator).
    Modify x so that all of the 2's are changed to 0.

14. Create a vector y containing the elements of x that are greater than 2.

15. Create a vector z with the elements

    3 NA 5 NA 4 1 2 3

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16. Now create a new vector called `newVec1` by summing y and z. Do the same calculation again and create a vector `newVec2` by summing y and z again.
    Print both vectors and see that there are missing values in both `newVec1` and `newVec2`.
17. Now use the function `mean()` to replace the missing values with the mean in `newVec1`.
18. Now use the function `median()` to replace the missing values with the median in `newVec2`.
19. Print both `newVec1` and `newVec2` and make a comment.

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20. Ten students were asked to rate the education quality of IST3110 Statistical Analysis with R class from 0 to 5, with
    - 0 representing 'very bad',
    - 1 representing 'bad',
    - 2 representing 'not bad'
    - 3 representing 'ok'
    - 4 representing 'good' and
    - 5 representing 'very good'

    Create a factor 'quality' to represent the below data. Print the factor variable 'quality'.

Student	1	2	3	4	5	6	7	8	9	10
Opinion	3	1	0	4	2	2	1	5	2	3

Hint: First create the vector 'opinion' by using the data from the table. Then convert this vector to a factor variable 'quality' with the given specification.