# Function Drills with Answers

Statistics 405

September 12, 2009

Write a simple function in R for each of the following tasks.

1. Return the circumference of a circle with the given radius.
2. Return the area of a circle with the given radius.
3. Return the area of a circle with the given radius.
4. Return the circumference, area (of the largest cross-section), and volume of a sphere with the given radius. Each should be labelled in the functions output.
5. Given the coefficients of a quadratic polynomial, return the roots.
6. Return the lowest positive value of a vector
7. Return the second lowest positive value of a vector
8. Divide each element in a numeric vector by the vector's length.
9. Test whether a number is even.
10. Test whether a number is odd.
11. If a number is odd add one to it.
12. If any number in a numeric vector is odd, add one to it
13. Test whether a number is an integer.
14. Find the range of a vector.
15. Find the sum of a numeric vector (without using `sum()`).
16. Find the mean of a numeric vector (without using `mean()`).
17. Find the mean of a vector that contains one or more NA's by ignoring any NA's (without using `mean()`).
18. Find the variance of a numeric vector (without using `var()`).
19. Automatically create a histogram of a vector.
20. Automatically create a histogram of a vector with the given number of bins.
21. Automatically create a scatterplot matrix with the variables in a given data frame.
22. Find the least common multiple of two numbers.
23. Index a series of observations by the first observation (hint: express each observation as a percentage of the first observation).

24. Find the determinant of a four by four matrix.

25. Separate the integer and decimal parts of a number, return them in a vector of length two.

26. Return the given vector with all NA's removed.

27. Return the row numbers of rows in a data frame that contain NA's.

28. Return the actual rows of a data frame that contain NAs.

29. Create a new vector by repeating a given vector a given number of times.

30. Double each element in a vector (e.g., turn *a,b,c,...* into *a, a, b, b, c,...*).

31. Randomly return one of the following phrases, "Ace", "King" or "Queen" with equal probability of returning each.

32. Randomly return one of the following phrases, "Ace", "King" or "Queen" with twice as much probability of returning "Ace" as either "King" or "Queen."

33. Take any character string and add "...in Stat 405" to the end.

34. Take any character string and add "...in Stat 405" to the end. Check that the input is a character string. Return an error if it is not.

35. Save the current graph with width = 6 and height = 6 as a pdf with the inputted name.

36. Save the current graph with a given width and height as a pdf with the inputted name.

37. Save a copy of a data frame as a comma separated values file whose filename is the name of the data frame plus ".csv"

38. Identify whether an object is a logical, character, or numeric object.

39. Display the number of groups of size n can be made from the inputted vector of length k.

40. Return the number of unique permutations that can be from a given vector (caution: don't use large vectors).

41. Return the number of unique sets that can be made from an inputted vector.

42. Return whichever the entered number is closest to: 0 or 1000.

43. Given a data frame with two columns, return all of the combinations of the two variables that occur once or more.

44. Automatically plot the above results with each variable on an axis and the number of occurrences (counts) represented by color.

45. Create a new vector where each *ith* element is the sum of the first $i$ elements of the given vector.

46. Select the number in a vector that is the greatest distance from the first element of the vector

47. Return whether a vector of numbers is right skewed or left skewed by comparing its mean and median.

48. Find the (statistical) mode of a vector.

49. Given a numeric vector of length 100, determine which element occurs at the 70th percentile.

50. Given a numeric vector of length 10, determine which element occurs at the 70th percentile.

51. Given a numeric vector of length 10, determine which element occurs at the 70th percentile.
52. Return a vector with its elements reordered in a random manner.
53. Return a vector with its elements ordered from smallest to largest.
54. Return a vector with its elements ordered largest to smallest.