Online ProfDip/MSc Self-Assessment Quiz

1 Introduction

Applicants should use this quiz as a method to self-assess their current knowledge. The quiz deals with topics with which you should be reasonably familiar if you are suitable for entry into the Online MSc in Data Analytics and its related programme, the Online Professional Diploma. The quiz is not assessed and there is no 'pass mark'. The answers are given on a separate page at the end of this document. This quiz is entirely independent of the entry process into the programme – you must meet the entry criteria for the programme irrespective of whether you find the below easy or hard.

2 Topics and example questions

The topics we feel are most important for students coming in to the programme are:

1. Basic algebraic manipulation

   Solve the simultaneous equations below to give values for x and y:

   $$2x + 3y = 1, 5x - 2y = 12$$

2. Basic probability questions

   Two 8-sided dice are rolled. What is the most likely value of the sum of the scores?

3. Basic combinatorics

   A lottery is run where balls numbered 1 to 30 are taken out of a bag. How many different ways are there of choosing 3 numbers from these 30?

4. Differentiation

Differentiate the below function f by x:

$$f(x, y) = e^{-\frac{1}{2}x^2 y}$$

5. Integration

Integrate the below function g over y:

$$g(y, z) = \frac{2y}{(y^2 + z)}$$

6. Simple matrix manipulation

If $A = \begin{bmatrix} 3 & 4 \\ 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 1 \\ 6 & 5 \end{bmatrix}$ what is AB? What is $A^T B$? What is the determinant of A?

7. Infinite series

What is the value of $\sum_{i=0}^{\infty} 0.5^i$?

8. Plotting functions

Sketch a plot of $y = 2x^2$ and $y = 2x^2 + 3x + 2$

9. Finding measures of location

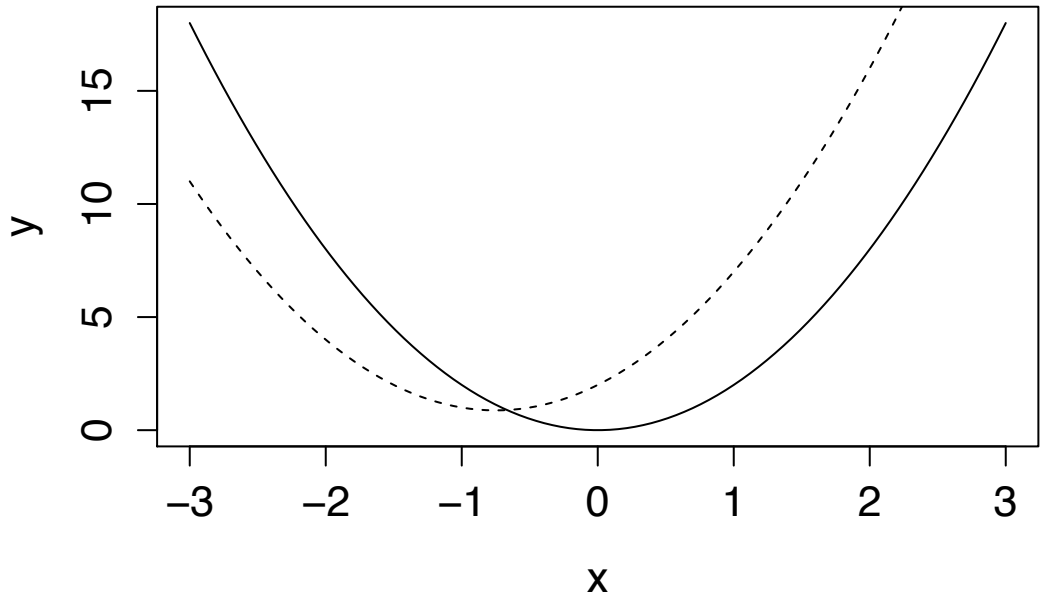
Find the mean, median and mode of the following 10 numbers: $3, 4, 7, 19, 2, 5, 7, 3, 2, 3$

10. Finding measures of scale

Find the standard deviation, variance and range of the following 10 numbers: $3, 4, 7, 19, 2, 5, 7, 3, 2, 3$

3 Answers

1. $x = 2, y = -1$
2. 9
3. 4060
4. $-xye^{-\frac{1}{2}x^2y}$
5. $\log(y^2 + z)$
6. $AB = A^TB = \begin{bmatrix} 36 & 23 \\ 34 & 19 \end{bmatrix}$. $det(A) = -7$.
7. 2



8.
9. Mean = 5.5, Median = 3.5, Mode = 3
10. Sd = 5.08, Var = 25.83, Range = 17