University of Roehampton London

Mathematics for Data Science **2022/23**

Week-1 Calculus in Data Science

Answer the following questions

1. 0 is included in the set of positive integers. (T/F)

2. 0 is included in the set of integers. (T/F)

3. Irrational numbers can be expressed as a fraction. (T/F)

4. Negative numbers are included in the set of Natural numbers. (T/F)

5. The value of *pie* is Irrational. (T/F)

Solve the following

1. Simplify the following numerical expression

$$-2\left(1\times 4-2\div 2\right)+\left(6+2-3\right)$$

2. What is x if $(x + 5)^{-3} = -1$?

3. Solve $(m/n)^{-2}(n/m)^{4}$

4. Simplify if, $\log(a/b)+\log(b/a)=\log(a+b)$.

5. Find the value of x if $\log(6x)-\log(4-x)=\log(3)$

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6.

$$\lim_{n\to\infty}\left(\frac{1}{1.5}+\frac{1}{5.9}+\ldots+\frac{1}{(4n-3)(4n+1)}\right)=$$

7.

$$\lim_{x\to 0}\frac{x(e^x-1)}{1-\cos x}$$ is equal to

8. Find the Derivative of $f(t)=(4t^2-t)(t^3-8t^2+12)$

9. Find the first order partial derivatives of the following function

$$f(x,y,z)=4x^3y^2-\mathbf{e}^z y^4+\frac{z^3}{x^2}+4y-x^{16}$$

10. Determine the area of the region bounded by

$x=3+y^2, x=2-y^2, y=1$ and $y=-2$.