

# Fast Quiz #1

## Numerical Functional Analysis

*Præparatus supervivet*

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## Question 1

**True/False:**  $d(x, y) = |x - y|^2$  is a metric on  $\mathbf{R}$ .

## Question 2

**True/False:** Suppose  $X$  is some space. Then for  $x, y \in X$ ,  $d(x, y) = 0$  when  $x = y$  and  $= 1$  otherwise defines a metric.

## Question 3

**True/False:** The *distance metric* between any two subsets  $A$  and  $B$  of a metric space  $(X, d)$  is given by

$$D(A, B) = \inf_{a \in A, b \in B} d(a, b).$$

## Question 4

**True/False:** Sets can be both open and closed at the same time.

## Question 5

**True/False:**  $d(x, y) = |x - y|^{1/2}$  is a metric on  $\mathbf{R}$ .

## Question 6

**True/False:** A sequence  $(x_n) \in X$  in a metric space which converges has to be bounded.

## Question 7

**True/False:** The subset of polynomials in the metric space  $C[a, b]$  is closed.



## Question 8

**True/False:** The set  $[-1, 1] \setminus \{0\}$  is an incomplete subspace of  $\mathbf{R}$ .