



C.U.S.T.

Capital University of Science and Technology

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Sample Admission Test for M.Phil Mathematics Degree Program

Q1. The derivative of  $a^x$  with respect to  $x$  is

- A)  $xa^{x-1}$       B)  $a^x$       C)  $a^x/\ln a$       D)  $a^x \ln a$

Q2. If  $f(x) = |x| + x$  for all real values of  $x$ , then  $f'(-1)$  is

- A) 2      B) 1      C) 0      D) does not exist

Q3. For the non-empty sets  $A$  and  $B$ , if  $(A - B) \cup B = A$ , then

- A)  $(B - A) \cup A = B$       B)  $B \subseteq A$       C)  $B$  is empty      D)  $A \subseteq B$

Q4. Which of the following statements are not true?

a)  $\int x \sin x \, dx = \sin^2 x - x \cos x + \sin x + \cos^2 x + C$

b)  $\int x \sin x \, dx = -x \cos x + C$

c)  $\int x \sin x \, dx = \frac{x^2}{2} \cos x + C$

d)  $\int x \sin x \, dx = -x \cos x + \sin x + C$

- A) a      B) b & d      C) c      D) a & d

Q5. What is the equation of all points in the  $xy$ -plane that are equidistance from the point  $(-1, 4)$  and  $(5, -2)$ ?

- A)  $2x - y = 3$       B)  $x - y = 6$       C)  $y = x^2 - 4x + 1$       D)  $x^2 + y^2 = 6$