National University of Computer and Emerging Sciences, Lahore Campus			
Course:	Discrete Structures	Course Code:	CS-1005
Program:	BCS	Semester:	Fall 22
Date:	October 17, 2022	Total Marks:	10
Name:		Roll No:	
Section:	B	Page(s):	1
Evaluation	Quiz-2		
Instruction/Notes:	Solve the quiz on the provided space		

1) Determine whether the statement is true or false. Justify your answer with proof or a counterexample, as appropriate

a) For every odd integer n, $5n^2 + 7$ is even.

b) For all real numbers a and b, if $a < b$ then $a < \frac{a+b}{2} < b$.

$n = 2k+1$ (odd integer)

1 (a) $5(2k+1)^2 + 7$

$5(4k^2 + 1 + 4k) + 7$

$20k^2 + 5 + 20k + 7$

$20k^2 + 20k + 12$

$2(10k^2 + 10k + 6)$

$10k^2 + 10k + 6$ is an integer because it is sum and product of integers so $2 \cdot$ (any integer) is even

hence statement is true

0 1

-2 -1 -2 -1.5 -1 $5/2$

$-3/2 = -1.5$

2 2.5 3.

2 8

2 5 8

(b) True

$a < b$

$a + a < b + a$

$2a < b + a$

$a < \frac{b+a}{2}$

$a < b$

$a + b < b + b$

$a + b < 2b$

$\frac{a+b}{2} < b$

1 ✓ proved $a < \frac{a+b}{2} < b$