

CS 589: Quiz 3, 20 October 2008 Name: _____ **KEY** _____

No books or notes. Work individually.

Question 1 (30 points): Consider relation scheme $R = A B C D E$, with a set of constraints $M = \{B \rightarrow A, \bowtie[A B D, C D E], AC \rightarrow D\}$. Below is a fragment of a relation $r(R)$. (That is, what is shown is *some* of the rows of r .) Explain why r cannot be in $SAT(M)$.

$r(A$	B	C	D	$E)$
...				
1	2	4	3	23
1	8	5	9	27
6	7	5	3	13
10	11	4	12	15
...				

Because r must satisfy the JD $\bowtie[A B D, C D E]$, and the bold part of the first row matched with the bold part of the third row, r must also contain the tuple

1 2 5 3 13

Note that this fact does not mean that r must violate the JD – we have only a fragment of r , so that tuple could be in the rest of r .

However, this tuple does cause a violation of $AC \rightarrow D$ with the second tuple above, since those tuples have the same values on A and C (1 and 5), but different values on d (9 versus 3).