

MATH 54 FALL 2017: DISCUSSION 205/208 QUIZ#9

GSI: CHRISTOPHER EUR, DATE: 10/27/2017

STUDENT NAME: \_\_\_\_\_

*Problem 1.* If true, prove the statement. If false, give a counterexample.

- (a) Suppose  $u, v_1, v_2 \in \mathbb{R}^2$  such that  $u \cdot v_1 = u \cdot v_2$ . Then  $v_1 = v_2$ .
- (b) If a  $n \times m$  matrix  $A$  has orthonormal columns, then  $AA^T = I_n$ .

*Problem 2.* Show that if a  $n \times m$  matrix consists of nonzero orthogonal columns, then  $m \leq n$ .  
(Hint: are the columns then linearly independent?)