

**CSCI 124 and CSCI 297 - Discrete Structures II - Fall 2007**

**Quiz 11 Solutions**

Is the set of vectors  $\{v_1 = (a, -a, a), v_2 = (b, b, 0), v_3 = (-1, 1, 2)\}$  linearly independent? No credit for an answer without justification. There is more than one way to solve this problem. The more elegant (simpler) solution will get more credit.

Solution: The three vectors are orthogonal, and hence linearly independent:

$$\langle v_1, v_2 \rangle = ab - ab + 0 = 0$$

$$\langle v_1, v_3 \rangle = -a - a + 2a = 0$$

$$\langle v_2, v_3 \rangle = -b + b + 0 = 0$$