① **Pair 1:**

$[2,-1,-2,1] \cdot [1,0,-2,-7] = 2\cdot1+(-1)\cdot0+(-2)\cdot(-2)+1\cdot(-7)$

not orthogonal $\qquad = 2+0+4-7=-1 \quad \times$

must equal
0

② **Pair 2:**

$[1,1,2] \cdot [3,2,-3] = 1\cdot3+1\cdot2+2\cdot(-3)$

not orthogonal $\quad = 3+2-6=-1$

③ **Pair 3:**

$[1,-2,0] \cdot [2,1,1] = 1\cdot2+(-2)\cdot1+0\cdot1$

$= 2-2+0$

orthogonal $\qquad = 0 \checkmark$

④ **Pair 4:**

$[a,b] \cdot [-b,a] = a(-b)+b(a)$

$= -ab+ab$

orthogonal
for all $\qquad = 0$
real a,b

⑤ **Pair 5:**

$[0,8,0,1,0,6] \cdot [1,0,9,0,3,0] =$

$0\cdot1+8\cdot0+0\cdot9+1\cdot0+0\cdot3+6\cdot0 = 0$

Orthogonal

⑥ **Pair 6:**

$[2,2,2] \cdot [-2,4,-2] =$

$2\cdot(-2)+2\cdot4+2\cdot(-2) =$

$-4+8-4=0$

Orthogonal