Exercise 1

Calculate the coordinates of $v$ relative to the orthogonal basis

$$\{(−1, 0, 0), (0, 1, 3), (0, −3, 1)\} :$$

(i) $v = (2, −1, 3);$  
(ii) $v = (1, −1, 1).$

Exercise 2

Use the Gram-Schmidt process to transform the given basis into orthogonal one:

(i) $u_1 = (2, 0), u_2 = (1, −3);$  
(ii) $u_1 = (1, 0, 1), u_2 = (1, 0, 0), u_3 = (2, 0, 1);$