

**Course 2E2 2007-08 (SF Engineers & MSISS & MEMS)****S h e e t 3**

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Due: at the end of the tutorial

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**Exercise 1**

Use matrix multiplication to find:

- (i) the reflection of the vector  $(-2, 3)$  about the  $x$ -axis;
- (ii) the orthogonal projection of the vector  $(-1, -2)$  to the  $y$ -axis;
- (iii) the image of the vector  $(1, -1)$  under rotation through the angle  $\frac{\pi}{3}$  about the origin.
- (iv) the image of the vector  $(2, 1, 1)$  under rotation through the angle  $-\frac{\pi}{4}$  about the  $z$ -axis.

**Exercise 2**

Determine which of the following are subspaces of  $\mathbb{R}^3$ :

- (i) the set of all vectors of the form  $(a, 2a, 0)$ ;
- (ii) the set of all vectors of the form  $(2, 3, a)$ ;
- (iii) the set of all vectors of the form  $(2b, 3b, a)$ .