

## MAU11S02 Group A2 Quiz 06 3pm 13/3/19 ANSWERS

### Rules and procedures.

**1.** Answers must be handed up at the end of the tutorial, no other time. **2.** Attempt 3 questions. Only *your first three answers* will be marked. **3.** Each question carries 10 marks, so the maximum quiz mark is 30. **4.** Marked quizzes will be returned, and answers published, the following week. **5.** If a particular method of solution is stipulated, you get no marks if you don't use it. **6.** The (9) quizzes will contribute 20% to your overall mark. **7.** You are allowed to collaborate and compare answers during the tutorial. **8. *Show all work.*** No marks will be given for answers which do not show the calculations.

### Answer 1.

$$\begin{array}{ccc} W_3 & 0 & -1 & -1 & 0 & -1 & -1 \\ & 0 & 0 & 1 & -1 & 0 & 0 \\ \text{cross product} & & & & & & \\ W_1 & -1 & 0 & 0 & W_2 & 0 & 1 & -1 \end{array}$$

$$|W_1| = 1 \quad |W_2| = \sqrt{2} \quad |W_3| = \sqrt{2}$$

$$S = \begin{bmatrix} -1 & 0 & 0 \\ 0 & \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \\ 0 & -\frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \end{bmatrix}$$

### Answer 2.

$$\begin{bmatrix} \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 \\ \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

and

$$\begin{bmatrix} -1 & 0 & 0 \\ 0 & \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \\ 0 & -\frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \end{bmatrix} \begin{bmatrix} \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} & 0 \\ \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 \\ 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 \\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{\sqrt{2}} \\ -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{\sqrt{2}} \end{bmatrix}$$

### Answer 3.

$$\begin{bmatrix} -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} & 0 \\ \frac{1}{2} & \frac{1}{2} & -\frac{1}{\sqrt{2}} \\ -\frac{1}{2} & -\frac{1}{2} & -\frac{1}{\sqrt{2}} \end{bmatrix} \begin{bmatrix} -1 & 0 & 0 \\ 0 & \frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \\ 0 & -\frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \end{bmatrix} = \begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{2} & -\frac{1}{2} \\ -\frac{1}{2} & \frac{1}{2} + \frac{1}{2\sqrt{2}} & \frac{1}{2} - \frac{1}{2\sqrt{2}} \\ \frac{1}{2} & \frac{1}{2} - \frac{1}{2\sqrt{2}} & \frac{1}{2} + \frac{1}{2\sqrt{2}} \end{bmatrix}$$

Answer 4.

$$\begin{bmatrix} 15 & -5 \\ -5 & 4 \end{bmatrix} \begin{bmatrix} m \\ c \end{bmatrix} = \begin{bmatrix} 5 \\ -1 \end{bmatrix}$$

Answer 5.

$$m = 3/7, \quad c = 2/7$$