

MAU11S02 Group A1 Quiz 05 9am 26/2/20 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 20 marks, so the maximum quiz mark is 60. **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.

$$\begin{aligned}N &= (1, 2, 3) \times (2, 3, 5) = (1, 1, -1) \\(4, 1, 4) &\mapsto Z = (1/3)(1, 1, -1) \\(4, 1, 4) &\mapsto W = 2Z - (4, 1, 4) = (-13/3, -1/3, -11/3)\end{aligned}$$

Answer 2.

$$\begin{aligned}(4, 1, 4) - (1/3, 1/3, -1/3) &= (11/3, 2/3, 13/3) \\(22/3, 4/3, 26/3) - (4, 1, 4) &= (10/3, 1/3, 14/3)\end{aligned}$$

Answer 3.

$$A^T A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 5 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 2 & 3 \\ 3 & 5 \end{bmatrix} = \begin{bmatrix} 14 & 23 \\ 23 & 38 \end{bmatrix}, \quad A^T X = \begin{bmatrix} 18 \\ 31 \end{bmatrix}$$

$$14x + 23y = 18; \quad 23x + 38y = 31$$

$$\begin{vmatrix} 14 & 23 \\ 23 & 38 \end{vmatrix} = 3, \quad \begin{vmatrix} 18 & 23 \\ 31 & 38 \end{vmatrix} = -29, \quad \begin{vmatrix} 14 & 18 \\ 23 & 31 \end{vmatrix} = 20,$$

$$x = \frac{-29}{3}, \quad y = \frac{20}{3}$$

Answer 4.

$$\begin{bmatrix} -\frac{1}{\sqrt{2}} & \frac{1}{\sqrt{6}} & \frac{1}{\sqrt{3}} \\ -\frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{6}} & -\frac{1}{\sqrt{3}} \\ 0 & -\frac{2}{\sqrt{6}} & \frac{1}{\sqrt{3}} \end{bmatrix}$$

Answer 5.

$$\begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{7}{9\sqrt{2}} & \frac{4}{9} \\ -\frac{1}{\sqrt{2}} & \frac{7}{9\sqrt{2}} & \frac{4}{9} \\ 0 & -\frac{8}{9\sqrt{2}} & \frac{7}{9} \end{bmatrix}$$