Matrices, determinants and inverses

Answers

Further Maths topic practice

This topic online

Q	Answer	Marks
1	**a)** (3, -17; 10, 8) **b)** (5, 15; -6, 10) **c)** (13, 19; -6, 2); AB ≠ BA, matrix multiplication is not commutative	4
2	**a)** PQ is 2 × 2; QP is 3 × 3 **b)** (-4, -9; 17, 23)	3
3	**a)** -2 **b)** $(-1, \frac{3}{2}; 2, -\frac{5}{2})$	3
4	**a)** k = 5 or k = -7 **b)** $\frac{1}{32}(-6, 4; 5, 2)$	5
5	det B = $2k^2 + k + 5 = 2(k + 1/4)^2 + 39/8 > 0$ for all real k, so B is never singular	4
6	**a)** $\frac{1}{5}(2, -1; -3, 4)$ **b)** X = (2, -1; 1, 3) **c)** Y = $\frac{1}{5}(21, -13; 7, 4)$	6
7	**a)** shown: det C = k^2 - 2k - 15 **b)** k = 5 or k = -3 **c)** $\frac{1}{15}(0, 3, -6; 5, -2, 4; -5, 8, -1)$	7
8	**a)** (-1, 3; -4, 11) **b)** (7, -2; -3, 1) **c)** r = (0; -1)	6
9	**a)** (7, 8; -4, -1) **b)** p = 4, q = -5 **c)** $\frac{1}{5}(1, -2; 1, 3)$	6
10	**a)** 13 - 3a **b)** a = $\frac{13}{3}$ **c)** (-11, 6, -2; -2, 1, 0; 6, -3, 1) **d)** $\frac{1}{2}(-11, 6, -2; -2, 1, 0; 6, -3, 1)$	8
11	**a)** 240 young, 270 adults **b)** $(-1, 2; \frac{5}{6}, 0)$ **c)** 100 young, 250 adults **d)** The model gives 250, close to the 247 recorded, so it seems a good model	7
12	**a)** shown **b)** k = ±2√2 **c)** k = 3 or k = -3 **d)** $\frac{1}{7}(-1, -4; 2, 1)$	7

Full worked solutions, written out by hand, are on the solutions sheet for this topic.

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