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Quiz 7

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. *(5 marks)* If A, B are 4×4 matrices, $\det(2A) = -16$ and $\det(B) = 2$ then find

$\det((AB)^t(2AB)^{-1}A^2B^3)$.

(show every step)

notice:
$$\det(2A) = -16$$
$$2^4 \det A = -16$$
$$\det A = -1$$

$$\det\left((AB)^t (2AB)^{-1} A^2 B^3\right)$$

$$= \det(AB)^t \det(2AB)^{-1} \det A^2 \det B^3$$

$$= \det AB \frac{1}{\det 2AB} (\det A)^2 (\det B)^3$$

$$= \det A \det B \frac{1}{2^4 \det A \det B} (\det A)^2 (\det B)^3$$

$$= \frac{(-1)^2 (2)^3}{2^4}$$

$$= \frac{1}{2}$$

Question 2. *(3 marks)* Show that if A is not invertable matrices then AB is not invertible.

$$\det(AB) = \det A \det B$$
$$= 0 \det B$$
$$= 0$$

$\det A = 0$ since A is not invertible

$\therefore$ AB is not invertible.

Question 3. *(2 marks)* If $\mathbf{u} = (1, 3, -1)$, $\mathbf{v} = (1, 2, -2)$ and $\mathbf{w} = (1, -1, 1)$ then compute

$-2(\mathbf{u} - 3\mathbf{v}) + 2\mathbf{w}$
$$= -2\vec{u} + 6\vec{v} + 2\vec{w}$$
$$= -2(1, 3, -1) + 6(1, 2, -2) + 2(1, -1, 1)$$
$$= (6, 4, -8)$$