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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 3×3 matrices, $\det(2A) = -24$ and $\det(B) = 3$ then find

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

(show every step)

notice:
$$\det(2A) = -24$$
$$2^3 \det A = -24$$
$$\det A = \frac{-24}{8} = -3$$

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

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

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

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

$$= \frac{3^5}{3^3}$$

$$= 3^2 = 9$$

Question 2. *(3 marks)* Show that if A, B are invertable matrices then AB is invertible.

Since A, B invertible $\Rightarrow \det A \neq 0$
$\det B \neq 0$

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

$\therefore AB$ is invertible

Question 3. *(2 marks)* If $\mathbf{u} = (2,3,-2)$, $\mathbf{v} = (1,0,-2)$ and $\mathbf{w} = (1,1,1)$ then compute

$-3(\mathbf{u}-2\mathbf{v})+4\mathbf{w} = -3\vec{u} + 6\vec{v} + 4\vec{w}$
$= -3(2,3,-2) + 6(1,0,-2) + 4(1,1,1)$
$= (4, -5, -2)$