

Example

Let A, B be 3×3 matrices with $\det(A) = 4$, and $\det(B) = -3$.

Compute:

1 $\det(AB)$

3 $\det(B^T)$

5 $\det(A^{-1})$

2 $\det(2A)$

4 $\det(A^3)$

6 $\det(BAB^{-1})$

Compute:

① $\det(AB) =$

Compute:

$$\textcircled{1} \det(AB) = \det(A)\det(B) =$$

Compute:

① $\det(AB) = \det(A)\det(B) = 4 \cdot -3 = -12$

② $\det(2A) =$

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① $\det(AB) = \det(A)\det(B) = 4 \cdot -3 = -12$

② $\det(2A) = 2^3\det(A)$

Compute:

① $\det(AB) = \det(A)\det(B) = 4 \cdot -3 = -12$

② $\det(2A) = 2^3\det(A) = 8 \cdot 4 = 32$

③ $\det(B^T)$

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$$\textcircled{3} \det(B^T) = \det(B)$$

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④ $\det(A^3)$

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$$\textcircled{4} \det(A^3) = (\det(A))^3$$

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③ $\det(B^T) = \det(B) = -3$

④ $\det(A^3) = (\det(A))^3 = 4^3 = 64$

⑤ $\det(A^{-1})$

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⑥ $\det(BAB^{-1})$

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$$\textcircled{6} \det(BAB^{-1}) = \det(B)\det(A)\det(B^{-1})$$

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$$= \det(B)\det(B^{-1})\det(A) = \det(A) = 4$$