

TRENDTV.COM  
An Aditya Birla Nuvo initiative

PETER ENGLAND

UPTO  
**50% OFF**

SHOP NOW

T&C APPLY

powered by Google™



www.mathwords.com

about mathwords  
website feedback

JET AIRWAYS

Monsoon Sale

Up to  
**30% off**  
on flights across IndiaPremière | Economy  
Valid up to Jul 13, 2015

BOOK NOW



Search

## Adjoint

index: click on a letter

A B C D E  
F G H I J  
K L M N O  
P Q R S T  
U V W X Y  
Z A to Z index

index: subject areas

numbers & symbols  
sets, logic, proofs  
geometry  
algebra  
trigonometry  
advanced algebra  
& pre-calculus  
calculus  
advanced topics  
probability &  
statistics  
real world  
applications  
multimedia  
entries

The [matrix](#) formed by taking the [transpose](#) of the [cofactor matrix](#) of a given original matrix. The adjoint of matrix A is often written adj A.

Note: This is in fact only one type of adjoint. More generally, an adjoint of a matrix is any mapping of a matrix which possesses certain properties. Consult a book on linear algebra for more information.

Example: Find the adjoint of the following matrix:

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \\ 1 & 0 & 6 \end{bmatrix}$$

Solution: First find the [cofactor](#) of each element.

$$\begin{aligned} A_{11} &= \begin{vmatrix} 4 & 5 \\ 0 & 6 \end{vmatrix} = 24 & A_{12} &= - \begin{vmatrix} 0 & 5 \\ 1 & 6 \end{vmatrix} = 5 & A_{13} &= \begin{vmatrix} 0 & 4 \\ 1 & 0 \end{vmatrix} = -4 \\ A_{21} &= - \begin{vmatrix} 2 & 3 \\ 0 & 6 \end{vmatrix} = -12 & A_{22} &= \begin{vmatrix} 1 & 3 \\ 1 & 6 \end{vmatrix} = 3 & A_{23} &= - \begin{vmatrix} 1 & 2 \\ 1 & 0 \end{vmatrix} = 2 \\ A_{31} &= \begin{vmatrix} 2 & 3 \\ 4 & 5 \end{vmatrix} = -2 & A_{32} &= - \begin{vmatrix} 1 & 3 \\ 0 & 5 \end{vmatrix} = -5 & A_{33} &= \begin{vmatrix} 1 & 2 \\ 0 & 4 \end{vmatrix} = 4 \end{aligned}$$

As a result the [cofactor matrix](#) of A is

$$\begin{bmatrix} 24 & 5 & -4 \\ -12 & 3 & 2 \\ -2 & -5 & 4 \end{bmatrix}$$

Finally the adjoint of A is the [transpose](#) of the cofactor matrix:

$$\text{adj } A = \begin{bmatrix} 24 & -12 & -2 \\ 5 & 3 & -5 \\ -4 & 2 & 4 \end{bmatrix}$$

## See also

[Inverse of a matrix](#)

this page updated 28-jul-14  
Mathwords: Terms and Formulas from Algebra I to  
Calculus  
written, illustrated, and webmastered by [Bruce  
Simmons](#)