

# Maximum Product of 3 no.

## 628. Maximum Product of Three Numbers

Easy

👍 3830

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Given an integer array `nums`, find three numbers whose product is maximum and return the maximum product.

Example 1:

Input: `nums = [1,2,3]`  
Output: 6

Example 2:

Input: `nums = [1,2,3,4]`  
Output: 24

Example 3:

Input: `nums = [-1,-2,-3]`  
Output: -6

The first thing that come in mind that we sort the Array and return the product of last three element, however in Given constrain we also have -ve value so multiply of 2 -ve No. will be +ve.

i.e `arr = [-22, 1, -9, 6, 5, 3]`

`sort = [-22, -9, 1, 3, 5, 6]`

product of  $= -22 \times -9 = 198$  (+ve)

This catch is only possible if both the no. are largest and -ve

Case 1:  $\rightarrow$  Single -ve element  $\times$  It will change sign to -ve

Case 2:  $\rightarrow$  2 -ve element:  $\checkmark$  only multiple them if both are largest

Case 3:  $\rightarrow$  3 -ve element:  $\times$  It will make Product -ve

Case 4:  $\rightarrow$  All -ve  $\times$  Impossible for Product of 3

$\downarrow$  only this case is valid

so after sort

$$\text{int ans} = \max(a[0] \times a[1] \times a[n], a[n-2] \times a[n-1] \times a[n])$$