

Problem 4

Calculate the **radical** of the **ABC triples** $(5,7,12)$ and $(27,64,91)$.



Joseph Oesterlé
(1954-)



David William Masser
(1948-)



Alan Baker
(1939-)



Shinichi
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(1969-)

https://en.wikipedia.org/wiki/Joseph_Oesterlé%C3%A9

https://en.wikipedia.org/wiki/David_Masser

[https://en.wikipedia.org/wiki/Alan_Baker_\(mathematician\)](https://en.wikipedia.org/wiki/Alan_Baker_(mathematician))

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➤ **ABC triple** means

◆ **$A + B = C$,**

◆ A and B are **relatively prime**
($\text{GCD}(A, B) = 1$)

➤ **Radical**

R = (product of P dividing $A \times B \times C$)

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Radical of (5,7,12)

$$A \times B \times C = 5 \times 7 \times 12 = 2^2 \times 3 \times 5 \times 7$$

Prime numbers dividing $A \times B \times C$ are 2,3,5,7.

The radical is $2 \times 3 \times 5 \times 7 = \mathbf{210}$.

Radical of (27,64,91)

$$A \times B \times C = 27 \times 64 \times 91 = 2^6 \times 3^3 \times 7 \times 13$$

The radical is $2 \times 3 \times 7 \times 13 = \mathbf{546}$.

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- For a given ABC triple (A, B, C) , it is easy to calculate the radical R .
- But it is very difficult to give a precise estimate of the **size of R** in terms of the **size of $A+B=C$** .

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ABC Conjecture (Oesterlé-Masser, 1980's)

For any $K > 0$,

$$C < R^{1+K}$$

except for finitely many ABC triples (A, B, C) .



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