

## Re: prove that $n^4 + n$ is never prime

**Source:** <http://sci.tech-archive.net/Archive/sci.math/2004-06/1878.html>

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Date: Thu, 10 Jun 2004 03:43:24 -0700

On Thu, 10 Jun 2004, Ken Oliver wrote:

> "DanKage" <[eba012@webmail.uib.no](mailto:eba012@webmail.uib.no)> wrote in message  
> > Sorry, the statement is that  $n^4 + 4$  is never prime (NOT  $n^4 + n$ )  
>  
>  $n^4 + 4 = n^4 + 4n^2 + 4 - 4n^2$  (add and subtract  $4n^2$ )  
>  
>  $= (n^2 + 2)^2 - 4n^2$   
>  
>  $= (n^2 + 2 + 2n^2)(n^2 + 2 - 2n^2)$  (Factor as diff of sq's)  
>  
> So  $n^4 + 4$  is factorable for all  $n \geq 2$ . Therefore not prime.  
>

Thanks for a most readable version.

Stuff like

$$n^4 + 4 = n^4 + 4n^2 + 4 - 4n^2 = (n^2 + 2)^2 - (2n)^2$$

as others are want to do, requires squinting and deciphering.