Re: Simple, but a bit hard, Trigonometry problem.

Source: http://sci.tech−archive.net/Archive/sci.math/2007−05/msg04966.html

- *From*: quasi <quasi@xxxxxxxx>
- *Date*: Mon, 28 May 2007 16:38:14 −0500

On Mon, 28 May 2007 21:21:02 +0100, David Hartley <me9@xxxxxxxxxxx>
wrote:

> In message <qtfm53l2nlpf05dq7r5b07moq1upe20cnv@xxxxxxx>, quasi
> <quasi@xxxxxxxx> writes
>
> > On Mon, 28 May 2007 15:46:16 −0500, quasi <quasi@xxxxxxxx> wrote:
> >
> > > On Mon, 28 May 2007 15:30:21 −0500, quasi
> > > <quasi@xxxxxxxx> wrote:
> > >
> > > > On Mon, 28 May 2007 14:42:53 −0500,
> > > > quasi <quasi@xxxxxxxx> wrote:
> > > >
> > > > > On Mon, 28 May 2007
> > > > > 14:27:57 −0500, quasi
> > > > > <quasi@xxxxxxxx> wrote:
> > > > >
> > > > > > Finding
> > > > > > angles
> > > > > > whose sines
> > > > > > have a
> > > > > > given
> > > > > > relation is
> > > > > > more
> > > > > > problematic.
> > > > > >
> > > > > > As a test
> > > > > > question, do
> > > > > > there exist 3
> > > > > > acute angles
> > > > > > with integer
> > > > > > degree
> > > > > > measures

> > > > n1,n2,n3
> > > > such that
> > > >
> > > > sin(n1)=sin(n2)*sin(n3)
> > > >
> > > > Ok, that was too easy.
> > > >
> > > > Let n1=30, n2=n3=45.
> > > >
> > > > I'll try to think of a better
> > > > one.
> > >
> > > Ok, here's a "trig problem" ...
> > >
> > > Consider the multiplicative group G
> > > generated by
> > >
> > > {sin(1),...,sin(44)} union {sin(46),...,sin(89)}
> > >
> > > where the angles above are in degrees.
> > >
> > > Is G the free abelian group with 88
> > > generators?
> >
> > No, they're not independent.
> >
> > sin (30) sin(2n) = sin(n) sin(90−n) for each n =1 to 44

Nice.

Ok, let's restrict the angles to less than 45 degrees.

Here's the revised problem.

Let G be the multiplicative group G generated by

{sin(1),...,sin(44)}

where the angles above are in degrees.

Is G the free abelian group with 44 generators?

quasi
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