The following curious example illustrates this fact.

Suppose we have a regular heptagon, a regular hexagon, a regular pentagon and four equilateral triangles, all the sides being of equal length, and we wish to make a polyhedron from them, each solid angle being a trihedral angle.

The number of faces $F=7$; the number of edges

$$E=\tfrac{1}{2}(7+6+5+4\,.\,3)=\tfrac{1}{2}\;30=15,$$

the number of vertices $V=\tfrac{1}{3}\,.\,30=10$.

Hence $F+V=17=E+2$, and Euler's condition is fulfilled.

But it is obviously impossible to construct such a surface, as there are only 6 other faces to fit to the 7 sides of the heptagon.

H. V. Mallison.

1074. *Note on approximations.*

This note provides an alternative to a section of Mr Inman's article, "What is Wrong with the Teaching of Approximations ?" (*Gazette*, XVI, December 1932, p. 306).

In the case of products, say $(A\pm h)(B\pm k)$, I suggest the following straightforward method.

Maximum limit	$AB+Ak+Bh+hk$
Minimum limit	$AB-Ak-Bh+hk$
Difference	$2Ak+2Bh$

If all the measurements were precisely accurate the true product would be

$$AB\pm hk\pm Ak\pm Bh.$$

Now as h and k are fractional, hk is less than either h or k, so hk must be omitted, and we are left with $AB\pm Ak\pm Bh$.

If $h=k$, the product is $AB\pm h(A+B)$.

In example (1), p. 309, $A=2{\cdot}68$ and $B=4{\cdot}12$,

$$h={\cdot}005,\text{ and so } h(A+B)={\cdot}005(6{\cdot}8)={\cdot}034.$$

As only two places of decimals are here allowable, the correct answer is $11{\cdot}04\pm{\cdot}03$ sq in.

Subtraction requires a little thought. Take for example

$$\begin{array}{r} 41{\cdot}3\pm{\cdot}05 \\ 11{\cdot}2\pm{\cdot}05 \\ \hline 30{\cdot}1\pm{\cdot}1 \end{array}$$

If the variations are taken of the same sign, the result will be 30·1, but if of contrary sign the result will be either 30 or 30·2.

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October 27, 1856 — April 18, 1933