SOME FUNNY EXAMPLES OF SMARANDACHE LUCKY METHODS IN ALGEBRA , TRIGONOMETRY, AND CALCULUS

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ABSTRACT : A number is said to be a Smarandache Lucky Number if an incorrect calculation leads to a correct result. For example, the fraction 42/21 = (4-2)/(2-1) = 2/1 = 2 is incorrectly calculated, but the result 2 is still correct. More generally a Smarandache Lucky Method is said to be any incorrect method which leads to a correct result. In Ref. [1] The following question is asked:

(1) Are there infinitely many Smarandache Lucky Numbers ?

We claim that the answer is YES.

Also in the present note we give some fascinating Smarandache Lucky Methods in algebra , trigonometry, and calculus.

A SMARANDACHE LUCKY METHOD IN TRIGONOMETRY :

Some students at the early stage of just having introduced to the concept of function , misunderstand the meaning of f(x) as the product of f and x.
e.g. for them sin(x) = product of sin and x. This gives rise to a funny lucky method applicable to the following identity.

To prove

$$\sin^2(x) - \sin^2(y) = \sin(x + y) . \sin(x - y)$$

LHS = $\sin^2(x) - \sin^2(y)$

$$= \{\sin(x) + \sin(y)\} . \{\sin(x) - \sin(y)\} \quad \text{----------(A)}$$

Taking sin common from both the factors

$= \{ \sin(x+y) \}. \{\sin(x-y)\}$

$=$ RHS

The correct method from (A) onwards should have been

$\{2 \sin((x+y)/2). \cos((x-y)/2)\}.\{2 \cos((x+y)/2). \sin((x-y)/2)\}.$

$= \{ 2 \sin((x+y)/2). \cos((x+y)/2)\}.\{2 \cos((x-y)/2\sin((x-y)/2)\}.$

$= \{ \sin(x+y) \}. \{\sin(x-y)\}$

= RHS

Remarks : The funny thing is the wrong lucky method is a shortcut more so to get carried away.

A SMARANDACHE LUCKY METHOD IN ALGEBRA:

In vector algebra the dot product of two vectors $(a_1 i + a_2 j + a_3 k)$ and $(b_1 i + b_2 j + b_3 k)$ is given by

$$(a_1 i + a_2 j + a_3 k) \bullet (b_1 i + b_2 j + b_3 k) = a_1 b_1 + a_2 b_2 + a_3 b_3$$

The same idea if extended to ordinary algebra would mean

$(a+b)(c+d) = ac + bd.$ ----------(B)

This wrong lucky method is applicable in proving the following algebraic identity.

$a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$

$RHS = (a+b+c)(a^2 + b^2 + c^2 - ab - bc - ca)$

$= (a+b+c)\{(a^2 - bc) + (b^2 - ac) + (c^2 - ab)\}$

applying the wrong lucky method (B) , one gets

$= a.(a^2 - bc) + b.(b^2 - ac) + c.(c^2 - ab)$

$= a^3 - abc + b^3 - abc + c^3 - abc$

$= a^3 + b^3 + c^3 - 3abc = LHS$

A SMARANDACHE LUCKY METHOD IN CALCULUS:

The fun involved in the following lucky method in calculus is two fold . It goes like this . A student is asked to differentiate the product of two functions. Instead of applying the formula for differentiation of product of two functions he applies the method of integration of the product of two functions (Integration by parts)and gets the correct answer. The height of coincidence is if another student given the same product of two functions and asked to integrate does the reverse of it i.e. he ends up in applying the formula for differentiation of the product of two functions and yet gets the correct answer. I would take the liberty to call such a lucky method to be **Smarandache superlucky method .** The suspense ends.

Consider the product of two functions x and sin (x) .

$f(x) = x$ and $g(x) = \sin(x)$

The Smarandache lucky method of differentiation (integration by parts) is

$$d\{f(x).g(x)\}/dx = f(x)\int g(x)dx - \int[\{d(f(x))/dx\}.\int g(x)dx]\mathbf{dx}$$

$$d\{(x).\sin(x)\}/dx = (x)\int \sin(x)dx - \int[\{d(x)/dx\}.\int \sin(x)dx]\mathbf{dx}$$

$= -(x).(\cos(x)) + \sin(x)$

$= -x.\cos(x) + \sin(x)$

The Smarandache lucky method of Integration

$$\int \{(f(x)).\, g(x)\}\mathbf{dx}. = f(x).d\{g(x)\}/dx + g(x)\, d\{f(x)\}/dx$$

Consider the same functions again we get by this lucky method

$$\int \{(x).\sin(x)\}\mathbf{dx}. = (x).\{\cos(x)\} + \{\sin(x)\}\ (1)$$

or $\int \{(x).\sin(x)\}\mathbf{dx}. = x.\cos(x) + \sin(x)$

That, both the answers are correct, can be verified, by applying the right methods.

REFERENCE:

[1] ' M.L.PEREZ and K.ATANASSOV' Definitions, Conjectures, and Unsolved problems on Smarandache Notions. American Research Press, 1999.

[2] 'F.SMARANDACHE', Funny Problems, Special Collections, Arizona State University, Hayden Library, Tempe, AZ, USA.