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A KEY PROBLEM BETWEEN MATHEMATICS & MEASUREMENT

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ABSTRACT
The square root of 2, known as root 2, radical 2, or Pythagoras' constant, and written as (√2), is the irrational, positive algebraic number that, when multiplied by itself, gives the number 2. Physically it is the length of a diagonal of unit square.

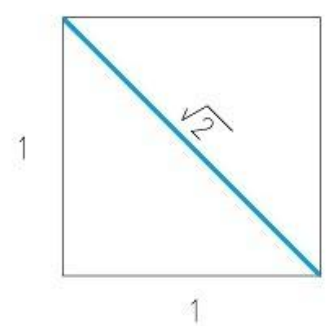

Figure: a

This paper aims for a possible explanation for problem with the measurement of square root of 2 & demonstrate a problem in mathematics & its real life application.

Keywords: *Pythagoras' Constant, Measurement, Scale, Time*

INTRODUCTION

The numerical value of (√2), truncated to 65 decimal places, is:
1.41421356237309504880168872420969807856967187537694807317667973799... (sequence A002193 in OEIS). (The next digit is 0.)
Up to 1 million digits has been calculated by NASA. So mathematically it is an infinite series between 1 & 2 but with a definite pattern (sequence A002193 in OEIS).Physically or visually we can exactly see how much distance is (√2). But still we cannot measure it directly i.e. means by scale. So here we explain physically what problem arises when it is measured during various problems.

Measurement of (√2)

If (√2) is represented on number line or scale it comes like:

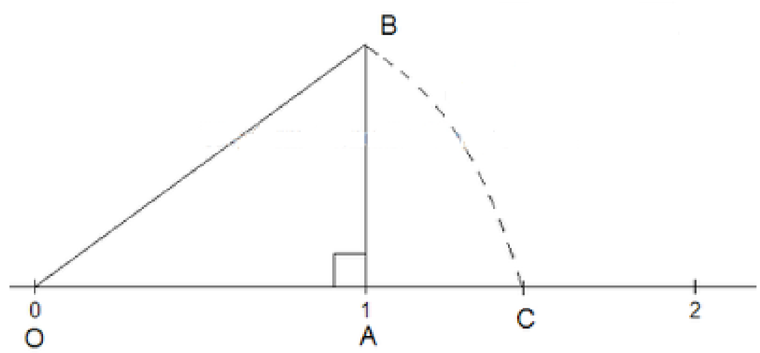

Figure: b

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Somewhere between 1 & 2, & from this exact value of it cannot be determined. To draw exact distance by using scale, the point "C" needed to be coincided with some marked point in number line or scale. To do that if a scale is taken that can measure much more precise distance in this case say up to 4 digits after the point then the point "C" will be as shown in the picture i.e. somewhere between 1.4142 & 1.4143 as shown in the below Figure c.

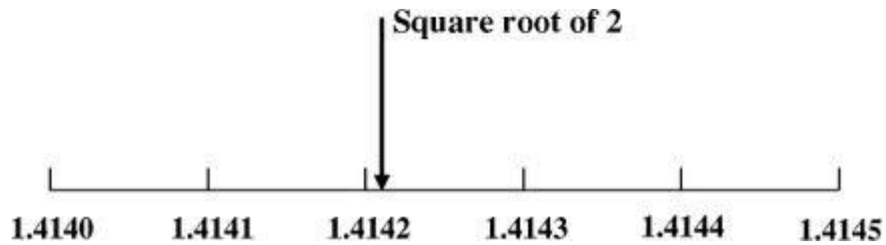

Figure: c

Thus no matter how much small measuring scale is being taken the value ($\sqrt{2}$) will never touch any marked point on the scale & it will be always somewhere between two consecutive marked points on the scale. Thus it is impossible to draw or measure ($\sqrt{2}$) with number line or scale though we know or can visualize how much distance is ($\sqrt{2}$) as shown in figure.
Now for another case if ($\sqrt{2}$) second is considered then after 1 second it will not be possible to get 2 second time, since in between them ($\sqrt{2}$) is there and the value of ($\sqrt{2}$) keeps on going in a never ending series so theoretically the time will get stuck at ($\sqrt{2}$) second & ($\sqrt{2}$) second seems to be occurring for infinite time. But practically it is not possible as we do get 2 second after 1 second.

Conclusion

Since the value of ($\sqrt{2}$) is never ending so it cannot be finite distance, which is according to Pythagoras'. But if the measured distance ($\sqrt{2}$) is finite then the value of ($\sqrt{2}$) cannot be a never ending number. Or it is an unavoidable problem between Mathematics & its application to real life.

REFERENCES

http://apod.nasa.gov/htmltest/gifcity/sqrt2.1mil