



EMPIRE STATE
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Common Sense and Word Problems

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Introduction

My research on math anxiety led me to the historical roots of teaching mathematics. I research the teaching methodology of Anania Shirakatsi, a famous Armenian mathematician of the 7th century. Anania Shirakatsi's methodology of teaching arithmetic to children, described in the manuscript, does not use any fancy visual aids, does not require memorization, and eliminates learning by rote while building strong mathematical, long-lasting knowledge. Shirakatsi's methodology was adopted and successfully used in Armenia for centuries and in the entire former Soviet Union. It has been proven to be very effective. Shirakatsi's methodology can be adopted and effectively used by elementary school teachers in the 21st-century diverse classroom environment.



Previous Research

Some authors incorrectly identified intuition as similar to common sense. Intuition is understanding or knowing something immediately based on feelings, not facts.

Common sense is a way of thinking that needs constant nourishing and application.

In schools, mathematics teaching has tended to promote skill in handling routine numerical, algebraic, and geometric operations. Consequently, students get bored handling routine operations they do not understand. Also, teachers convert classrooms into test prep centers. This teaching methodology results in learning mathematics by rote, not by understanding, which cannot develop common sense.



Previous Research (continued)

The more people are trained to think one way (by our workplace, family, culture, etc.), the greater the chance that sometimes we allow sloppy or auto-pilot thinking to replace common sense. The net effect is that some adults stop using their common sense.

Students stop using their naturally existing common sense in learning mathematics.

Common sense is a way of thinking that needs constant nourishing and application.



My Findings

Teaching mathematics using common sense cannot be effective in teaching mathematics to adults who are accustomed to not using their common sense. However, the same methodology can be effective for pre-K, K, and elementary school children who are not yet accustomed not to using their common sense. This methodology will teach children to use common sense and develop their analytical thinking.

A logical definition/explanation will help students understand, eliminating its memorization. Therefore, it will not require students to spend hours on rote learning and memorization.

Solving word problems develops analytical thinking skills.



Problem-Solving by Adult Learners

If you can drive your car 58 miles using 2.5 gallons of gas, how many gallons of gas do you need to drive 1 mile?

The student's answer was 145 gallons. It had to be obvious that 145 gallons of gas is too much for driving just one mile.

My version. If you can drive your car 58 miles using 2.5 gallons of gas, how many gallons of gas do you need to drive 1 mile?

Check your answer before you submit it by performing the following calculations:

The gas you need to drive 1 mile should be (choose one)

- greater than the gas you need to drive 58 miles
- less than the gas you need to drive 58 miles.

If you use _____ (provide your answer) gallons of gas to drive 1 mile, then you need _____ gallons of gas to drive 58 miles. Compare with the given number.



Solving More Complex Problems

A machine costs \$24,900.00 and has a salvage value of \$1,000.00. If the estimated useful life is 50,000 hours, the unit depreciation would be _____.

The student's answer was \$6000. (The correct answer is \$0.478.) This problem can be solved by performing two operations. The student failed to estimate that if the machine depreciates by \$6000 per hour, then after 4 hours, the cost of the machine will be less than the salvage value. That is, the machine's useful life is less than 4 hours, while it is given that the estimated useful life is 50,000 hours.



Solving More Complex Problems (continued)

My version. A machine costs \$24,900.00 and has a salvage value of \$1,000.00. If the estimated useful life is 50,000 hours, the unit depreciation would be _____.

Check your answer before you submit it by performing the following calculations:

If the machine depreciates by \$_____ (provide your answer) per hour, then the depreciation amount in 50,000 hours should be (check one)

- greater than the cost of the machine
- less than the cost of the machine.

If the depreciation amount is $\$24,900.00 - \$1,000.00 = \$23,900.00$, and the machine depreciates by \$_____ (provide your answer) an hour, then the useful life of the machine will be _____ hours. Compare with the given number.



Conclusion

Students learn about addition and subtraction, multiplication, and division without understanding. They do not learn how these arithmetic operations are related and how to use them.

Without a basic knowledge of mathematics, learning more complex topics becomes challenging, and understanding becomes almost impossible. The use of common sense will help students to avoid providing meaningless answers.

Students are lacking understanding of how large or small the numbers are.

Students form an opinion that thinking is not required in learning mathematics.



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THANK YOU FOR YOUR
ATTENTION.

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