

Mathematics in General Exercises

Select a topic, like “What percent of 8 is 5?” and research how to teach it and all the prerequisite experiences the student should have prior to broaching this subject. Describe the skills you would expect the student to have prior to the study of the topic and the method you would use to introduce it.

Where do you stand on the use of a calculator, and why?

Present your opinion of the Mathematically Correct site.
<http://www.mathematicallycorrect.com>

Present your opinion of the Mathematically Sane site.
<http://www.mathematicallysane.com/home.asp>

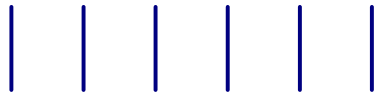
Compare and contrast the Mathematically Sane and Mathematically correct site positions. Where do you side, and why?

Develop a position paper on whether or not there is value to spending so much time teaching students to deal manually with decimals in light of the existence of inexpensive technology that deals with them so easily.

Consider the answer you developed for the preceding question. Would it be any different if you were talking to students, parents, members of your department, teachers who work in grades before yours and, finally, school administrators? Why would you make any changes to deal with different groups or why would you leave things the same?

Divide 30 by $\frac{1}{2}$ and add 10. What is the answer? Explain an error most students will make.

Given six congruent parallel line segments arranged so they are perpendicular to an imaginary horizontal line, add five more line segments to make nine.



Where does the “Z” go and why?

A EF HI KLMN T VWXY
BCD G J OPQRS U

What value can be added to 1,000,000 so the result will be larger than if the 1,000,000 is multiplied by the same value? Is your answer unique? Why or why not?

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Given a nine-stall-long horse barn, how can ten horses be housed such that no two horses occupy the same stall, none are running free, none are being ridden, and so on.

Pick a number. Triple it. Add 12. Divide by 3. Subtract 4. What do you get? Why does this work?

Select a three-digit number (374). Affix a duplicate of that number to either end, giving a six-digit number (374,374). Divide the six-digit number by 7. Divide the missing factor from that division by 11. Divide the missing factor from that second division by 13. What did you get? Why does this work?

Some movie scripts describe ransom situations where a million dollars in small unmarked bills is to be left at some remote location. The alleged culprit picks up the package and runs away. Suppose the payment was in \$10 bills. How much would the \$1,000,000 weigh? A bill in United States currency weighs approximately 1 gram. What is a reasonable denomination for the alleged culprit to request so the escape can be effected?

A window was a square, a meter on a side. That window admitted too much light so half the area was covered. After that, the window was still a meter high and a meter wide. How can that be?

Use three line segments (straight, curved, open, or closed) to divide a circle into eight sections, each of which has the same area.

A bear was followed 3 miles south, 3 miles west, and then 3 miles north. At that point, the trail crossed the initial trail. What color was the bear?

Suppose the earth is a sphere with an equator 25,000 miles in length. A circular band is placed around the equator that is concentric with it and 25,000 miles plus 10 feet long. Which of the following most closely approximates the distance between the band and the equator:

- (A) Thickness of standard piece of notebook paper
- (B) 8.5-inch side of standard piece of notebook paper
- (C) 11-inch side of standard piece of notebook paper
- (D) You

A "hole" can be cut in an 8.5-inch by 11-inch piece of paper that can be large enough for a person to step through. How?

Purchase a bag of M&Ms. Before opening it, predict the percentage of each color that will be present. Do you suppose the results from one bag are indicative of the all results? Why or why not?

Mathematics in General Exercises

Investigate perfect numbers. In the process, answer questions like the ones that follow. You should not limit your research to answering the listed questions. What are the next two perfect numbers after 28? How many perfect numbers have been found to date? Has it been established that all perfect numbers have been found?

Twelve, 18, 24, and 36 are listed as abundant numbers. Are all abundant numbers multiples of 6? Is there a multiple of 6 that is not an abundant number? Are there abundant numbers that are not multiples of 6? List examples and explain your position.

Prime numbers are deficient numbers. Is there a pattern for nonprime deficient numbers? List examples and explain your position.

Resources

Brumbaugh, D. K., Ortiz, E., Gresham, G. (2006). *Teaching Middle School Mathematics*. Mahwah, NJ: Lawrence Erlbaum Associates.

Brumbaugh, D., Rock, D. (2006 (3rd Ed.)). *Teaching Secondary Mathematics*. Mahwah, NJ: Lawrence Erlbaum Associates.

Brumbaugh, D., Rock, D. (2001). *Scratch Your Brain C1*. Pacific Grove, CA: Critical Thinking Books and Software.