

A mathematics challenge to try: Questions

In elementary school mathematics text books you will find little boxes containing problems with the words such as *'Try this'* attached to them. In keeping with this tradition, try the following five questions. They come from my research with pre-service teachers. Part of the research involved pre-service teachers writing a mathematics problem-solving and concept test. The concepts and problems were based on grades 1 through 8 mathematics curricula. The test consisted of a mixture of open questions and multiple choice questions (21 questions in all). Give yourself about 15 minutes to do the five sample questions. Solutions and comments are available.

Question #1

It takes 15 minutes to cook an ostrich egg. You have two sand clock egg timers: a 7-minute timer and an 11-minute timer. There are no minute markings on them. They only let you tell when 7 and 11 minutes have elapsed. How can the two timers be used to make sure that the ostrich egg cooks for 15 minutes?

Question #2

Tony and Mary wanted to split the cost of buying their mother a birthday present evenly. To begin with, Mary contributed \$195 while Tony contributed \$35. (1) How much money will Tony have to give Mary so that each of them ends up contributing the same amount? (2) Express your solution in a general way by providing a formula or a statement of what to do to solve such problems.

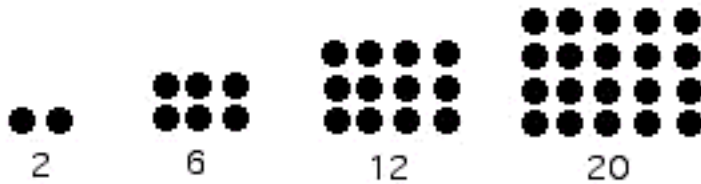
Question #3

320 people share a lottery win of \$27 642 064 equally among themselves. A calculator is used to figure out how much money each person receives. To do that, $27642064 \div 320$ is entered into the machine. The calculator's display shows the result: 86381.45. The result means that the remainder when dividing 27642064 by 320 is:

- a) .45
- b) 45
- c) 144
- d) 275
- e) 155

Question #4

The pattern of dots shown below form a sequence of numbers.



What is the 50th term of the sequence?

Question #5

Whenever you have brackets in an arithmetic expression, what is inside the brackets:

- a) should be done whenever it is convenient.
- b) should be done first if it only involves addition.
- c) should be done first if it is simple.
- d) must always be done last.
- e) must always be done first because it is a mathematical law.