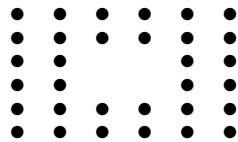


PROBLEM SECTION

You are invited to submit solutions to any or all of the following problems, accompanied by your name, school and year. Solutions of these problems will appear in the next issue of **Parabola**; your solution(s) may be used if they are received in time.

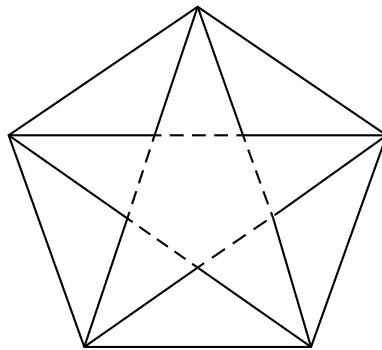
Q1105 A *hollow square* is an arrangement of dots in a square with a central square left blank. For example here are thirty two dots arranged in a hollow square.



In how many different ways can 960 dots be formed into a hollow square.

Q1106 How many different ways are there of making six prime numbers which together use each of the nine digits 1, 2, 3, ..., 9 exactly once?

Q1107 Is the large pentagon more than twice, or less than twice, the area of the star inside it?



Q1108 It is a curious fact that $\sqrt{2\frac{2}{3}} = 2\sqrt{\frac{2}{3}}$. Is this isolated or are there other such expressions? Find all solutions to $\sqrt{m+x} = m\sqrt{x}$ where m is a positive integer and x is real.

Q1109 Determine the smallest value of $x^2 + 5y^2 + 8z^2$, where x , y and z are real numbers subject to the condition $yz + zx + xy = -1$. Does $x^2 + 5y^2 + 8z^2$ have a *greatest* value subject to the same condition? Justify both answers.

Q1110 Let f be a function mapping positive integers into positive integers. Suppose that $f(n+1) > f(n)$ and $f(f(n)) = 3n$ for all positive integers n . Determine $f(2001)$.