Ideas in Mathematics

1. **Find the operator.**
   Given 2 numbers (a,b) and their solution. Can I tell the operator without the trivial trial and error?
   $a \; o \; b = c$
   Given a more complex equation:
   $\{(a \; o_1 \; b) \; o_2 \; c\} \; o_3 \; d = x$
   (where o_1, o_2, o_3 represent 3 different operators)

   I can try increasing the numbers and operators involved, are there any minimum number of equations required to uniquely identify operators is another question?
   I have tried approaching the problem with different methods.

2. **Integrals for elliptic functions** can't be solved, hence we have approximate solutions for the perimeter of ellipse.
   One approach I tried was an experimental one, a sphere made out of clay, compressed so as to form a geometrical shape that has the cross-section of an ellipse.
   On interpolating values and a few trials, I was able to exactly deduce an analytical equation:

   Perimeter of Ellipse = $\pi(a+b)$, *where a and b are major and minor axis respectively.*

   This formula was introduced by mathematician Naïve and has a substantial amount of error.

   3) Naive approximation

   (K3) $S'(a, b) = 2\pi\frac{a+b}{2} = \pi(a+b)$, $E'(x) = \frac{\pi}{4}(1+y)$

   Interestingly, it turns out that simple **arithmetic mean** of the two semi-axes is a much better estimate for the equivalent circle radius than the geometric mean. Hence this approximation, referred to as *naive* by G.P.Michon and P.Bourke, even though it is more accurate and computationally more effective than Kepler's.

   I'm curious if I can increase the accuracy with an experimental but better approach.

3. **Number Matrix:** My interest grew in solving while solving a simple array of numbers, where

$$\begin{array}{ccc} a & & b \\ & x_1 & \\ a+x_1 & & b+x_1 \\ & x_2 & \end{array}$$

   and so on ....
   In this array, a and b are added to get x_1 , which is then again added to (a,b) to get 3rd row of numbers. The centre points give me a geometrical progression while side columns follow an arithmetic progression.
   I have sufficient equations describing the nature of this matrix.

   I like working on the Riemann hypothesis and Collatz conjecture and recently have been curious to approach some of the prime number problems from a complex network approach.