

## January 2009

Solutions will be provided next month.

1) Solve the equation  $x^{\log_{27} 8} + 8^{\log_{27} x} = 32$ .

2) Find as many sets of three positive integers  $\{a, b, c\}$  as you can such that  $a^2 + b^2 = c^2$ , and  $a, b,$  and  $c$  are relatively prime. ( $a, b,$  and  $c$  are relatively prime if they have no common positive factors except 1).

EXAMPLES:  $\{3, 4, 5\}$  and  $\{5, 12, 13\}$  would count. However,  $\{6, 8, 10\}$  would not count, since 6, 8, and 10 each have 2 as a factor.

3) Find positive integers  $a, b, c,$  and  $d,$  such that  $a^3 + b^3 + c^3 = d^3$ .