The Puzzle Column
We think it might be fun and entertaining to introduce lightweight puzzles to our monthly newsletters to stimulate some curiosity and have our students (and staff!) have a go at solving them. Each newsletter carries a puzzle. We will post the names of the first 30 students who provide correct solutions in the next month’s newsletter. Everyone is welcome to contribute new puzzles. Please email Nagendra.gulur@unt.edu for puzzle ideas and solutions to posted puzzles. Please start the subject line of your email with “PUZZLE:”.

September Puzzle
Part 1: Consider the division: \( y = \frac{a}{b} / \frac{c}{d} \). In how many different ways can the expression \( \frac{a}{b} / \frac{c}{d} \) be parenthesized so as to evaluate to different values? For eg: consider \( y = \frac{a}{b} / c \). This expression can be parenthesized in two ways: i. \( y = \left( \frac{a}{b} \right) / c \) yielding \( y = a/(bc) \) and ii. \( y = a/(b/c) \) yielding \( y = (ac)/b \). Now, when we are given an expression with \( n \) variables: \( \frac{a_1}{a_2} / \frac{a_3}{.../a_n} \), in how many unique ways can we parenthesize this expression so as to yield different evaluations?

Part 2: Given the division: \( = \frac{1}{2} / \frac{3}{4} /.../2n \), is there a way to parenthesize this expression so as to achieve a value of \( y = 1 \) for some \( n \)?