Puzzle of the Week
Letter Substitutions – 1

Rules:

1. A letter represents a digit from 0 to 9, and has the same value throughout a single puzzle.
2. No number can start with the digit 0.
3. Within a puzzle, different letters must have different values.

$$\begin{array}{r} 8 \\ +\ A \\ \hline B\ 2 \end{array} \quad \Rightarrow \quad \begin{array}{r} 8 \\ +\ 4 \\ \hline 1\ 2 \end{array}$$

THE CHALLENGE: Find the value of C, D, E, F and G in these puzzles.

$$\begin{array}{r} C \\ +\ 8 \\ \hline D \end{array} \qquad \begin{array}{r} E \\ +\ E \\ \hline 8 \end{array} \qquad \begin{array}{r} F \\ +\ F \\ \hline G\ 4 \end{array}$$

EXPLORATION: Make some letter substitution puzzles for your friends to solve.

Puzzle of the Week
Letter Substitutions – 1 – Notes

THE CHALLENGE: In the C + 8 = D, the sum must be less than 10. C cannot be 0 because that would break the rule of not having numbers start with 0. Therefore C is 1 and D is 9, which gives the answer: 1 + 8 = 9.

E must be half of 8, so E is 4. The answer is: 4 + 4 = 8.

This problem involves an important insight about adding: if you add two single-digit numbers, including possibly a carry, the result cannot be larger than 19, so the carry is always either 0 or 1. For this problem, the carry must be 1, so G is 1. F is half of 14, so F is 7. The answer is: 7 + 7 = 14.

EXPLORATION: Here are two, slightly more challenging, letter substitution puzzles to play with.

H + 4 = KK: K must be 1, so the problem becomes H + 4 = 11, which forces H = 7. The answer is: 7 + 4 = 11.

M + M + 8 = MN: As a carry, M could be 1 or 2. However, if M is 2 then 2 + 2 + 8 must be at least 20, which it isn't. Therefore, M is 1 and the answer becomes 1 + 1 + 8 = 10.