Huddle 2010

1. You roll three dice. Take the number on the first die, multiply it by 5, add 7, then double the result. Add the number on the second die, multiply the result by 10, then add the number on the third die. The final result is 401. List, in order, the numbers on the three dice.

2. Each letter stands for a different digit, to form an ordinary sum.

$$\begin{array}{cccccc} & A & B & C & B \\ + & D & C & E & D \\ \hline C & B & A & B & D \end{array}$$

What digit is D ?

3. Consider two circles with the same center. The inner circle has radius 1. Between the two circles are 6 more circles, each tangent to the inner circle, the outer circle, and the two adjacent in-between circles. What is the radius of the outer circle?

4. Suppose that $F(x, y) = (-y, x)$. Evaluate $F(F(\cdots(F(F(20, 10)))\cdots))$; the function F is applied 2010 times.