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A Winter Wonderland of Holiday Puzzles

1) John Conway's Family Puzzle John says, "I have sons and daughters. Each of my daughters has an equal number of brothers and sisters. Each of my sons has twice as many sisters as brothers. How many sons and daughters do I have?" Can you solve John's problem? A good strategy might be trial and error. Explain your solution!

2) Four jolly men sat down to play,  
And played all night till break of day.  
They played for cash and not for fun,  
With separate scores for every one.

Yet when they came to square accounts,  
They all had made quite fair amounts!  
Can you this paradox explain?  
If no one lost, how can all gain?

3) Counting those Threes! How many numbers between one and a hundred have a three in them? Okay, how many numbers between one and a thousand have a three in them? ("Have a three" means have at least one three.)

4) Bracelets Jody wants to make hoop bracelets with five beads on each. (Each bead will be a different color, and Jody has beads that are red, blue, green, yellow and white.) How many different bracelets can be made? "Different" means that if your bracelet is in the lost-and-found, you can recognize it as yours and no one else's. Can you draw (or make) the whole set?

5) Happy New Year! Is 2019 a prime number? If not, what are its factors? What's the next year that will be a prime number? Our school started in 1987. Was that a prime number? How many of the years of our school's history have been prime numbers? Explain how you got your answers!

6) Cross out eleven letters in such a way that the remaining letters spell a single word!

NAISNIENLGELTETWEORRSD

7) A Simple Multiplication Here's a straightforward problem! For some reason, not too many students have solved it.. (No calculators please!)

116,415,321,826,934,814,453,125 x 8,589,934,592

8) There are two big glasses. One contains 8 oz. of water, and the other has 8 oz. of wine. One ounce of wine is added to the water and the mixture is stirred. Now one ounce of the mixture is poured into the wine. Is there now more wine in the water, or more water in the wine? Or are they equal? Explain!

9) Take a piece of paper, 4 inches by 8 inches, and divide it into 8 squares and number them (one side only) as shown below. Fold up this map so the 1 is on top and all the numbers are in order below it.

|   |   |   |   |
|---|---|---|---|
| 1 | 8 | 7 | 4 |
| 2 | 3 | 6 | 5 |

10) Pennies - Warning: Some of these are trick questions!

10a) Can you place ten pennies in three empty cups so there is an odd number of pennies in each cup?

10b) Place ten pennies in a row. Two players take turns and must remove one or two pennies on each turn. The player who takes the last penny loses. Who has the advantage, first or second player?

10c) Put ten pennies in a circle. Each player may take one or two, but if you take two they must be right next to each other (with no penny or open space between them). The player who takes the last penny wins. Who has the advantage, first or second player?

12) Have fun! Happy New Year!