

Team Problems 35 minutes Calculators allowed

T1. A semicircle has one endpoint at $A(2,5)$ and its other endpoint B on the line $x=6$. The semicircle also includes another (non end-)point C on the line $x=6$. The y -coordinate of C is twice the y -coordinate of B . Find the coordinates of C .

T2. In Dodecaland, the lottery gives prizes that are powers of 12, so each prize is either \$1, \$12, \$144, \$1728, \$20736, \$248832, \$2985984, or \$35831808. This month, they gave out a total amount of \$9210725. There were no more than ten prizes of any given denomination. How many \$144 prizes were given?

T3. Find all ordered triples of positive integers (x, y, z) which satisfy $xy + x + y = 23$, $xz + x + z = 47$, and $yz + y + z = 31$

T4. Babe Math went on a camping trip when his favorite baseball team, the Primes, had completed 157 games and had 5 games to go in the last week of the season. A couple of weeks later, Babe finds the remains of a burnt newspaper from some time during the last week of the season showing the Primes with a winning pct. of .360 on that day [pct. is winning percentage: i.e. number of wins / total number of games, result rounded to nearest thousandth]. Even though the won-lost record was burnt, Babe could figure it out. Find the Primes' won-lost record that was on the burnt paper. Give your answer as an ordered pair (number of wins, number of losses)

T5. In a triangle with sides 6, 9, and 10, find the length of the angle bisector of the largest angle.

T6. Complete the cross-number puzzle at right in which each across answer is a four-digit positive integer and each down answer is a three-digit positive integer. [Note: the grid at right is for scratch work only. Write your answer in the answer space as a 3 by 4 array of numbers (just as they appear in the grid)]

1	2	3	4
5			
6			

Across

1. Number divisible by 9

5. Each digit is a different off Fibonacci number

6. A Fibonacci Number.

Down

1. Sum of coefficients in expansion of $(5a - 3b)^8$

2. A Fibonacci Number

3. A perfect Cube

4. A palindrome with all odd digits

Answers

T1. (6,2.5)

T2. 3

T3. (5,3,7)

T4. (58, 103)

T5. $\sqrt{30}$ or 5.477

2 9 2 5

T6. 5 8 1 3

6 7 6 5