CSHS -1993
Alg 2 Team

1. How many primes are there between 3 and 103?

2. Solve: $\frac{x^2+7x-4}{x-5} \geq 2$

3. In the series: $1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \ldots$

$A = \sum_{1}^{\infty}$ $\qquad$ $B = \sum_{1}^{10}$

C = common ratio $\qquad$ D = Thirteenth term

Find: $\frac{B \cdot C}{A \cdot D}$

4. At Cornell, the hockey tickets cost \$20, and 900 people attend games. After a survey is taken, it is determined that for each \$1 decrease in ticket price, 50 more people will attend. What would be the most profitable price for the Cornell hockey games?

5. Stephanie needs to choose five courses from a list of eighteen courses. How many schedules may she have, assuming no conflicts exist?

6. 1) $-16x^2 + 9y^2 = 144$ $\qquad$ 2) $9x^2 + 16y^2 = 144$

A = Length from Center to Focus of Conic 1
B = Length of Conjugate Axis of Conic 1
C = Length from Center to Focus of Conic 2
D = Average of lengths of Major and Minor Axes of Conic 2

Find: $A + B + \frac{C^2}{D}$

7. Find the number of zeros at the end of 190!

8. From the following linear equations, find the sum of the elements in the matrix that is 56 times the inverse of the matrix N_Z, where N_Z is derived from the use of Cramer's Rule.

$3x + 2y - z = 0$
$5x + y + 3z = 0$
$2z - 5y + 4z = 8$

9. If 2 and 2 + i are two roots of a cubic equation, then find the sum of the coefficients of the equation when written as a standard polynomial with integer coefficients.

10. Solve: $\sqrt{t^2 - 3} - t = 1$

11. What is the sum of the elements in the matrix that is the product of:

$$\begin{bmatrix} 2 & 3 \\ 1 & 5 \end{bmatrix} \text{ and } \begin{bmatrix} 1 & 2 & 4 \\ 3 & 6 & 1 \end{bmatrix}$$

12. By the equation $F = G\frac{m_1 \cdot m_2}{r^2}$ (known as Newton's Law of Gravitation), if G, m_1, and m_2 are constants, and r is 6×10^6 and F is the result of this r, then in terms of r, what new r would make a new F one-fourth the old F?

13. Evaluate: $\begin{vmatrix} 1 & 2 & 2 & 1 \\ 3 & 4 & 4 & 3 \\ 5 & 6 & 6 & 5 \\ 7 & 8 & 8 & 7 \end{vmatrix}$

14. If $f(x) = x^2 + 6x + 7$, the coordinates of the vertex = (h,k), and the roots are at A and B, then find $\frac{h \cdot k}{A + B}$.

15. $f(x) = x^4 + 5x^3 - 7x^2 - 29x + 30$

A = Product of the zeros

B = Sum of zeros

C = Mean of A and B

D = Maximum number of complex zeros

Find: A + B - 2C + D