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TEAM QUESTION 1 ALGEBRA II PCHS INVITATIONAL 2/22/92

1. FIND A + B + C + D if.....

A is the sum of the values of x that satisfy the following equaiton.

$$\begin{vmatrix} x & 2x^2 \\ 2x^2 & x^2 \end{vmatrix} = 0$$

B is the sum of the elements in the inverse of the matrix

$$\begin{bmatrix} 2 & -1 \\ -3 & -4 \end{bmatrix}$$

C is the determinant of the matrix XY if $X = \begin{bmatrix} 5 & -1 \\ 2 & 2 \end{bmatrix}$

and $Y = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

D is the determinant of the matrix $\begin{bmatrix} 2 & -4 & 1 \\ 0 & -3 & -3 \\ 7 & 9 & 11 \end{bmatrix}$

TEAM QUESTION 2 ALGEBRA II PCHS INVITATIONAL 2/22/92

2. Find the equation of the line that contains the vertex of the parabola $x^2 + 4x - 4y + 16 = 0$ and the vertex of the parabola $y^2 - 7x - 8y + 51 = 0$.

(Write answer in the form Ax + By + C = 0)

TEAM QUESTION 3 ALGEBRA II PCHS INVITATIONAL 2/22/92

3. Find the area between the ellipse

$9x^2 + 4y^2 - 36x + 16y + 16 = 0$

and the circle

$x^2 + y^2 - 2x + 2y - 18 = 0.$

TEAM QUESTION 4 ALGEBRA II PCHS INVITATIONAL 2/22/92

4. Find the sum of the first 10 elements is the sequence below to the nearest hundredth.

log 1, log 3, log 9, log 27, ..., log 19,683

if log 3 ≈ .4771.

TEAM QUESTION 5 ALGEBRA II PCHS INVITATIONAL 2/22/92

5. If the sides of a triangle are of consecutive integeral length and its perimeter is 96, then find the area of this triangle.

TEAM QUESTION 6 ALGEBRA II PCHS INVITATIONAL 2/22/92

6. SOLVE for $x + y$ if ...

$$\log_2(\log_3(\log_2 x)) = 1$$

$$\log_y\left[(\log_2 x)\ \frac{y}{9} \right] = 2$$

TEAM QUESTION 7 ALGEBRA II PCHS INVITATIONAL 2/22/92

7. SOLVE for x : $\dfrac{|x + 3|}{|x|} < 4$

TEAM QUESTION 8 ALGEBRA II PCHS INVITATIONAL 2/22/92

8. Find n if $123_{\text{base n}} \times 234_{\text{base n}} = 34110_{\text{base n}}$

(Assume n must be positive)

TEAM QUESTION 9 ALGEBRA II PCHS INVITATIONAL 2/22/92

9. Find all solutions to the following equation:

$$\sqrt{x+1} - \sqrt{x-10} = 5$$

TEAM QUESTION 10 ALGEBRA II PCHS INVITATIONAL 2/22/92

10. Find the number of integral factors in the number 10,886,400.

TEAM QUESTION 11 ALGEBRA II PCHS INVITATIONAL 2/22/92

11. Find the probability of getting a flush
(all cards of the same suit) when drawing
5 cards from a 52 card deck.

TEAM QUESTION 12 ALGEBRA II PCHS INVITATIONAL 2/22/92

12. If

A is the 46th element in the 52nd row of Pascal's triangle

B is the 5th element in the 45th row of Pascals' triangle

C is the 6th element in the 19th row of Pascal's triangle

D is the 12th element in the 52nd row of Pascal's triangle

then find $\dfrac{{}_{18}P_5 \times AB}{CD}$

TEAM QUESTION 13 ALGEBRA II PCHS INVITATIONAL 2/22/92

13. Evaluate when $x = 5$

$$\frac{2\left[3^{x-4}\right] + 3^{x}}{7\left[3^{x+5}\right]}$$

TEAM QUESTION 14 ALGEBRA II PCHS INVITATIONAL 2/22/92

14. Find the area of the convex polygon whose vertices are $(5,-2)$, $(5,1)$, $(-1,5)$, $(-2,0)$, $(2,-2)$, and $(3,4)$.

TEAM QUEATION 15 ALGEBRA II PCHS INVITATIONAL 2/2292

15. IF $f(x) = 2x^2 - 3x + 1$,

FIND $\frac{f(x+h) - f(x)}{h}$.