Plant

ALGEBRA TWO JANUARY 13, 1996
TEAM QUESTION 1

LET **A** = THE DISCRIMINANT OF $X^2 - 6X + 8 = 0$.
LET **B** = THE Y-COORDINATE OF THE VERTEX OF $Y = X^2 - 6X + 8$.
LET **C** = THE SUM OF THE ROOTS OF THE EQUATION $2X^2 - 8X - 13 = 0$.
LET **D** = THE PRODUCT OF THE ROOTS OF THE EQUATION $3X^2 - 13X + 8 = 0$.

STATE THE VALUE OF $D^B + A - C$

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TEAM QUESTION 2

LET **A** = $\dfrac{8-3i}{5+2i} \div \dfrac{34-31i}{58}$ LET **B** = $8^{\log_8 3^2}$ LET **C** = $\dfrac{2}{3}\log_2 64$

A • B • C = ?

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TEAM QUESTION 3

MULTIPLY THE UNITS DIGIT OF 19^{96} TIMES THE 99th DIGIT IN THE

REPETEND OF THE FRACTION $3/7$ TIMES THE SLOPE OF THE

EQUATION $\dfrac{X-2}{\frac{2}{3}} + \dfrac{Y+3}{\frac{1}{4}} = 1$. **STATE YOUR INTEGER ANSWER.**

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TEAM QUESTION 4

GIVEN THAT $2 - 3i$ IS A ROOT OF $Y^5 - 2Y^4 + 6Y^3 + 24Y^2 + 5Y + 26 = 0$,
STATE ALL OF THE EQUATION'S ROOTS, INCLUDING $2 - 3i$.

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TEAM QUESTION 5

SOLVE $X - 2\sqrt{X} - 2 = 0$ **STATE** YOUR **ANSWER(S)** IN **RADICAL FORM.**

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TEAM QUESTION 6

LET **A** = THE BASE TEN NUMBER FOR 1403_5.
LET **B** = THE HINDU-ARABIC NUMBER FOR THE ROMAN NUMERAL CCXLIX.
LET **C** = THE BASE TEN (10) NUMBER FOR $2A4_{12}$.
LET **D** = ${}_{11}P_2 + {}_{11}C_2$

STATE THE VALUE OF **A + B – (C + D)**

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TEAM QUESTION 7

$f(X) = 2X^2 - 3X + 1$ $g(X) = X - 1$

FIND $(f \circ g)_{(2)} - (g \circ f)_{(-1)}$.

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TEAM QUESTION **8**
USING CRAMER'S RULE, YOU COULD SOLVE THIS 3 BY 3 SYSTEM FOR Y.

$$Y = \frac{\begin{vmatrix} 3 & 8 & 2 \\ 2 & -2 & 1 \\ 1 & 4 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & -1 & 2 \\ 2 & 1 & 1 \\ 1 & 2 & -2 \end{vmatrix}}$$

A. IN THE FORM AX + BY + CZ = D,
WRITE THE EQUATION FROM THIS
SYSTEM THAT HAS THE LARGEST
VALUE FOR D.
B. SOLVE THIS SYSTEM FOR Y.

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TEAM QUESTION **9**
SOLVE FOR THE ORDERED PAIR (X , Y) IF
$4X(1 + i) - Y(1 + 3i) = 5 - 17i$.

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TEAM QUESTION **10**
SOLVE FOR Y: $\left(\frac{Y}{9} - \frac{1}{27}\right)^{-3} = 3^{12}$

LET X REPRESENT THE TOTAL NUMBER OF DISTINCT X-INTERCEPTS OF THE GRAPH OF THE FUNCTION $\mathbf{Y = X^3 - 4X^2 - 3X + 18}$.

EVALUATE $\frac{X}{Y}$.

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TEAM QUESTION **11**
LET A BE THE SOLUTION TO $1 + 2^A + 2^{2A} = 73$.

LET B BE THE NUMBER OF POSITIVE INTEGER FACTORS OF 288.
LET C = $\frac{X}{Z}$ GIVEN $\frac{X}{Y} = \frac{4}{9}$ AND $\frac{Y}{Z} = \frac{9}{4}$.
LET D = i^{-930}.

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TEAM QUESTION **12**
GIVEN $\begin{Vmatrix} X & -1 & 2 \\ 1 & 1 & -1 \\ 1 & 1 & 2 \end{Vmatrix} < \begin{Vmatrix} 2 & 1 & -1 & 2 \\ 2 & 1 & 1 & 1 \\ 1 & 3 & -1 & 1 \\ 1 & 2 & 2 & -1 \end{Vmatrix}$

AFTER SIMPLIFYING THESE TWO DETERMINANTS, HOW MANY INTEGER SOLUTIONS DOES THIS ABSOLUTE VALUE INEQUALITY HAVE?

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TEAM QUESTION **13**

SOLVE EACH EQUATION FOR ITS TWO ROOTS. SELECT THE LARGER ROOT OF EACH EQUATION AND FIND THEIR **PRODUCT**.

A. $(2X - 3)^2 - 49 = 0$

B. $\frac{1}{X} + \frac{4}{X+3} = 2$

C. $\sqrt{2X-1} - \sqrt{X-4} = 2$

D. $3(5X - 11)^2 - 10(5X - 11) - 8 = 0$

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TEAM QUESTION **14**

ADD THE FOLLOWING MEANS :

A. THE ARITHMETIC MEAN OF 11 AND 44.
B. THE GEOMETRIC MEANS OF 11 AND 44.
C. THE HARMONIC MEAN OF 11 AND 44.

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TEAM QUESTION **15**

THE SUM OF TWO NUMBERS IS 16. THREE TIMES THE RECIPROCAL OF THE FIRST NUMBER ADDED TO THREE TIMES THE RECIPROCAL OF THE SECOND NUMBER EQUALS THE FRACTION $\frac{4}{5}$.

WHAT IS 3 TIMES THE LARGER OF THE TWO NUMBERS MINUS 5 TIMES THE SMALLER OF THE TWO NUMBERS ?