CATEGORY 1

NUMBER THEORY '90 Meet 3

~1989

1. _____

2. _____

3. _____

1. FIND THE LCM OF 24 AND 60 DIVIDED BY THE GCF OF 24 AND 60.

2. THE LCM OF TWO NUMBERS IS 240 WHILE THEIR GCF IS 16. IF ONE NUMBER IS 80 WHAT IS THE OTHER NUMBER?

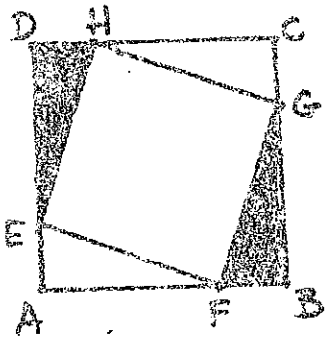
3. A "MERSENNE PRIME" IS A PRIME THAT CAN BE WRITTEN IN THE FORM $2^p - 1$ WHERE p IS PRIME.

FIND THE LARGEST MERSENNE PRIME THAT IS LESS THAN 1000.

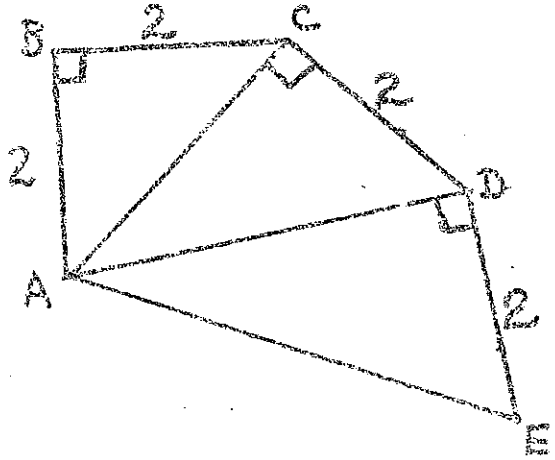
CATEGORY 2
GEOMETRY Properties of polygons, Pythagorean Theorem

1. _____
2. _____
3. _____

1. IN PARALLELOGRAM ABCD, THE MEASURE OF ANGLE A IS 1/3 THE MEASURE OF ANGLE B. HOW MANY DEGREES IS ANGLE A?

2. 

SQUARE ABCD HAS A PERIMETER OF 112
SQUARE EFGH HAS A PERIMETER OF 80
WHAT IS THE AREA OF THE SHADED REGION?

3. 

FIND THE LENGTH OF $\overline{AE}$.

CATEGORY 3

MYSTERY

1. _____

2. _____

3. _____

1. A NUMBER HAS THE FOLLOWING CHARACTERISTICS:
   ITS DIGITS ARE ONLY 2'S AND 3'S.
   IT CONTAINS AT LEAST ONE 2 AND ONE 3.
   IT IS DIVISIBLE BY BOTH 2 AND 3.
   WHAT IS THE SMALLEST NUMBER THIS COULD BE?

2. SIX PEOPLE CAN PAINT A HOUSE IN FOUR DAYS. HOW MANY PEOPLE WILL IT TAKE TO PAINT THE SAME HOUSE AT THE SAME RATE IN THREE DAYS?

3. IN THE FOLLOWING SEQUENCE WHAT IS THE SUM OF THE FIRST 200 TERMS.

   3, 7, 11, 15, 19...

FACTOR 4

ARITHMETIC

Integral Powers (pos, neg, & zero)
roots up to 6th root

1. _____

2. _____

3. _____

1 EXPRESS $.\overline{162}$ AS A LOWEST TERM FRACTION.

2. $\frac{1.21}{1.1} = \frac{1.1}{?}$

3. $\frac{.\overline{6}}{1.4} \times .0\overline{83} \times 2.6$

WRITE THE PRODUCT OF THESE THREE FACTORS AS A DECIMAL.

CATEGORY 5 Absolute Value inequalities including interpreting line graphs & Direct proportions

ALGEBRA

1. $x =$ ______

2. { ______ }

3. { ______ }

1. $\frac{3x}{10x+2} = \frac{2}{7}$ SOLVE FOR x.

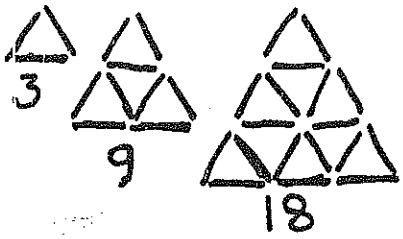
2. IF $t \in \{0, 1, 2, 3, 4 \ldots\}$, WHAT IS THE SOLUTION SET OF $\frac{1}{3}(6t-9)+8=2(t-1)+7$

3. IF y IS A MEMBER OF THE SET OF INTEGERS WHAT IS THE SOLUTION SET OF THE FOLLOWING INEQUALITY:

$$|4y+2| \leq 10$$

CATEGORY 6
TEAM QUESTIONS

1. A=
2. B=
3. C=
4. D=
5. E=
6. F=

1. 

HOW MANY TOOTHPICKS WILL IT TAKE TO MAKE A TRIANGLE LIKE THE ONES ABOVE BUT WITH A BASE OF TEN TOOTHPICKS?

2. WHAT INTEGER MULTIPLIED TIMES 52,631,578,947,368,421 WILL RESULT IN ALL NINES?

3. A MAN IS Y YEARS OLD IN THE YEAR Y^2. IF THE YEAR Y^2 IS IN THE 20^{TH} CENTURY WHEN WAS THE MAN BORN?

4. THE ANIMALS IN THE BARN ARE ALL EITHER CHICKENS OR PIGS. THERE ARE 12 MORE CHICKENS THAN PIGS. THERE IS A TOTAL OF 126 FEET. HOW MANY ANIMALS ARE IN THE BARN?

5. 12, 6, 3, 10, 5, 16... IS A SEQUENCE FORMED BY THE FOLLOWING RULES: 1) IF A NUMBER IS EVEN DIVIDE BY TWO TO GET THE NEXT NUMBER. 2) IF A NUMBER IS ODD, MULTIPLY BY 3 AND ADD 1 TO GET THE NEXT NUMBER. WHAT IS THE 1000^{TH} TERM IN THIS SEQUENCE?

6. USING THE ANSWERS FROM QUESTIONS 1-5 SOLVE FOR F.

$$B[A-(D+B)]=C+EF$$

ISWERS

T. 1
IMBER
EORY
10
48
127

AT. 2
EOMETRY
45
192
4

T. 3
YSTERY
2232
8
80,200

T. 4
EITHMETIC
6/37
1
.1

4T. 5
GEBRA
$x = 4$
$\{0,1,2,3,4\ldots\}$
$\{-3,-2,-1,0,1,2\}$

CAT. 6
TEAM
1 A = 165
2 B = 19
3 C = 1892
4 D = 46
5 E = 1
6 F = 8