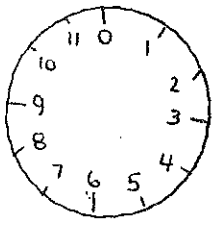
Winchester Meet #4

March 93

CATEGORY 1 ~ NUMBER THEORY ~ MARCH 1993

1. SIMPLIFY $(4 \times 4)^4$ MOD 12



2. FIND THE NEXT TERM IN THE SEQUENCE

324, 289, 256, 225, 196, _____

3. FIND THE SUM OF THE FIRST 50 TERMS IN THE SEQUENCE 3, 8, 13, 18...

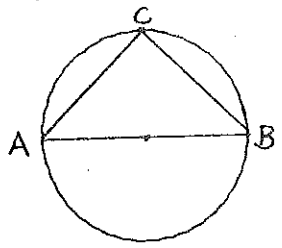
ANSWERS

1. _____

2. _____

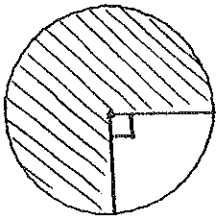
3. _____

CATEGORY 2 — GEOMETRY — MARCH 1993

1. 

GIVEN: $\overline{AB}$ IS A DIAMETER
INSCRIBED TRIANGLE ABC IS ISOSCELES
WHAT IS THE MEASURE OF $\angle A$?

2. WHAT IS THE CIRCUMFERENCE OF A CIRCLE WHOSE AREA IS 4.5216 in^2? (USE 3.14 FOR π)

3. 

IF THE AREA OF THE SHADED PORTION IS 2722.38 cm^2 WHAT IS THE DIAMETER? (USE 3.14 FOR π)

ANSWERS	
1.	°
2.	in
3.	cm

CATEGORY 3 ~ MYSTERY ~ MARCH 1993

1. GIVEN THE TWO NUMBERS .5 AND $\frac{1}{3}$ WHAT SHOULD BE THE THIRD NUMBER IN ORDER TO MAKE THE AVERAGE OF ALL THREE EQUAL TO ONE?

2. WHICH IS SMALLEST: $\frac{17}{52}$; $32\frac{1}{7}\%$; $\frac{1\frac{1}{5}}{3.7}$

3. SIMPLIFY AND GIVE THE ANSWER IN DECIMAL FORM

$$\frac{.\overline{6}}{5} \times \frac{.125}{.0625} \times 12\tfrac{1}{2}\%$$

ANSWERS

1 _____

2 _____

3 _____

ANSWERS

CAT 1. NUM. TH.

1. 4
2. 169 [sequence of squares]
3. 6275 [50th term = 3+(5×49) = 248; sum = (3+248)·25]

CAT 2 GEOM

1. 45°
2. 7.536 [4.5216 ÷ 3.14 = 1.44 r = $\sqrt{1.44}$ = 1.2 C = 2(1.4)3.14]
3. 68 [2722.38 ÷ 3 × 4 ÷ 3.14 = 1156 r = $\sqrt{1156}$ = 34 d = 34(2)]

CAT 3 MYS

1. $2\frac{1}{6}$ or $\frac{13}{6}$ or $2.1\overline{6}$ [$\frac{1}{2}+\frac{1}{3}+\square=3$]
2. $32\frac{1}{7}\%$ [.32142857]
3. $.0\overline{3}$ [only acceptable answer – to be done on calculator. $.\overline{6}$ must be entered as $2\div3$]

CAT 4-ARITH

1. #35.97 [55 − 22 + 2.97]
2. 4.5% [23040 ÷ 512,000]
3. #1040.60 [1000×.04×.25 = 10; 1010×.04×.25 = 10.10; 1020.10×.25×.04 = 10.201; 1030.301×.25×.04 = 10.303; #1040.60]

CAT 5 – ALG

1. 29
2. 21 [$\frac{a+2}{2} = a-9$; $a = 20$; 20, 21, 22]
3. 52 [$K+(K-9)+(K-9+8)=149$; $K=53$; $K-9+8=52$]

CAT 6 – TEAM

1. 75° [1 min = 6°; 17.5 min to 30 min = 12.5 min; 12.5×6 = 75]
2. 800 km/hr [4 min ½ speed = 2 min full speed ∴ rate = (80 km)/(6 min or $\frac{1}{10}$ hr)]
3. 5050 [4950 + 100]
4. 24 [24×25×26]
5. 16 [IF I = Prt and I = P then rt = 1; .0625t = 1; t = 16]
6. 2 [$5050\cdot16 = 800F + 800\cdot75 + 800\cdot24$]