Meet 3
Jan 91

Answers:

Cat. 1 Number Theory

1. 6 — 7, 17, 37, 47, 67, 97 others eliminated by use of divisibility rules.
2. 81 — LCM is 90 GCF is 9 $81 = 90 - 9$
3. 900 — $2 \cdot 2 \cdot 3 \cdot 3 \cdot 5 \cdot 5$

Cat 2 Geometry

1. 800 — $P = 160$ 16 sides $\therefore$ each side $= 10$ $A = 10^2 \cdot 8$
2. 60° — $m\angle AFE = 720°/6 = 120°$; $m\angle AFG = 180° - 120° = 60°$
3. 56 — $m\overline{QM} = \sqrt{12^2 + 5^2} = 13$ $m\overline{MN} = 180 \div 12 = 15$ $A = 2(13) + 2(15)$

Cat 3 Mystery

1. 8
2. 1
3. 11

$a \times 2 - b = c$; $10 \times 2 - 9 = 11$

Cat. 4 Arithmetic

1. $\frac{4}{33}$ — $\frac{12}{99} = \frac{4}{33}$
2. 7 — 4, 5, 6, 7, 8, 9, 10
3. $\frac{11}{18}$ — Solve algebraically or $.6\overline{1} = .6\frac{1}{9} = \frac{\frac{55}{9}}{10} = \frac{55}{90} = \frac{11}{18}$

Cat. 5 Algebra

1. 6 — $\frac{\frac{15}{8}}{50} = \frac{x}{160} \Rightarrow 50x = 300 \Rightarrow x = 6$
2. $n \in \mathbb{R}$ — accept any representation that indicates that the solution set is the set of real numbers.
3. $\{1, 2, 3, 4\}$

Cat. 6 Team

1. 52.5 — $(2+100) \div 2 = 51$ $(3+99) \div 2 = 51$ $(4+100) \div 2 = 52$ $\boxed{(5+100) \div 2 = 52.5}$ $(6+96) \div 2 = 51$ Average of smallest and largest multiple
2. 27 — $3(a+b) = 10a + b \Rightarrow 3a + 3b = 10a + b \Rightarrow 2b = 7a \therefore a = 2, b = 7$
3. 576 — 12:4:3 is 19 parts $76 \div 19 = 4$ $12 \cdot 4 = 48$ $3 \cdot 4 = 12$ $48 \cdot 12 = 576$
4. 2310 — Divisible by 2, 3, 5, 7
5. 28 — Mort + Bob $= 20$ (4+4, 4+4+4) Bob 12 (6+6) $\therefore$ Gordon 18 (6+6+6) In 10 years $18 + 10$
6. 609

Category 1
Number Theory
January, 1991

1. _____
2. _____
3. _____

1. How many prime numbers less than 100 have a 7 in the ones digit?

2. Find the difference between the LCM and the GCF of 18 and 45.

3. Find the LCM of the following set of numbers:

$\{6, 9, 12, 15, 18, 25, 30\}$

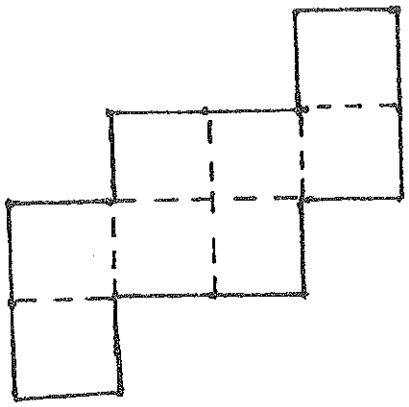
1. _____ cm²

2. _____

3. _____ m

Category 2
Geometry
January, 1991

1.



This figure is made up of 8 identical squares. The perimeter of the figure is 160cm. What is the area?

2.

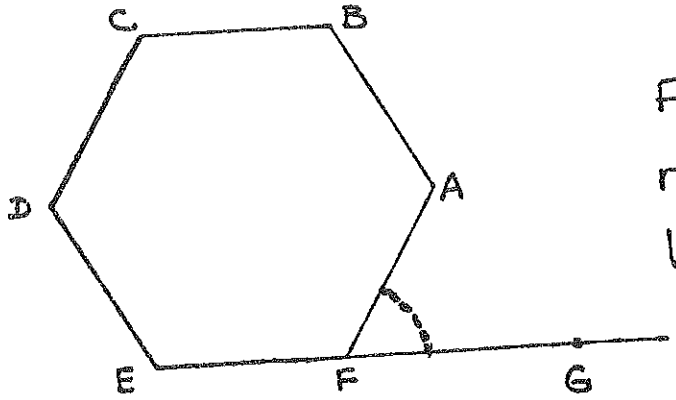
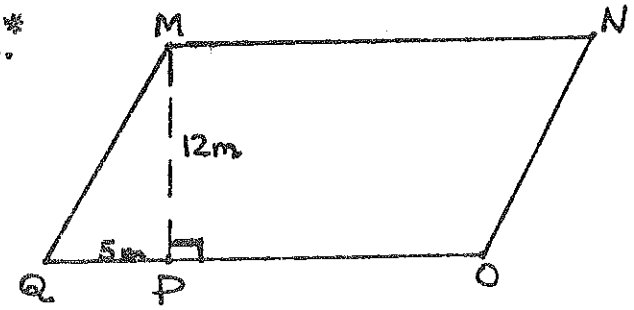


Figure ABCDEF is a regular hexagon. What is the measure of ∠AFG?

3*



If the area of this parallelogram is 180 m², what is its perimeter?

m $\overline{MP}$ = 12m
m $\overline{QP}$ = 5m

*[NOTE: FIGURES ARE NOT NECESSARILY DRAWN TO SCALE.]

1. _____

2. _____

3. _____

Category 3
Mystery
January, 1991

1. $\begin{array}{r} 6A \\ \times A2 \\ \hline 5576 \end{array}$ What digit does A represent?

2. Simplify:

$$\frac{(.1)^4}{(.01)^2}$$

3. Determine the function of Ψ in order to find the value of X in the following pattern.

$$4 \Psi 3 = 5$$
$$6 \Psi 5 = 7$$
$$1 \Psi 1 = 1$$
$$5 \Psi 6 = 4$$
$$2 \Psi 4 = 0$$
$$10 \Psi 9 = X$$

Category 4
Arithmetic
January, 1991

1. _____
2. _____
3. _____

1. Convert $.\overline{12}$ to a fraction in lowest terms.

2. How many whole numbers are between $\sqrt{10}$ and $\sqrt{110}$?

3. Change $.6\overline{1}$ to a fraction. Simplify if necessary.

Algebra
Category 5
January, 1991

1. _____ in.

2. {_____}

3. {_____}

1. On a road map $1\frac{5}{8}$ inches represents 50 miles. What distance on the map represents 160 mi?

2. Find the sdution set:

$$3(8+n)+(2n-13)=5n+11$$

3. Find the solution set if x is a member of the set of integers.

$$|2x-5| \leq 3$$

Team Questions
Category 6
January, 1991

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

1. First, determine which of the following sets of numbers has the greatest average. Then, find that average.

set 1: multiples of 2 between 1 and 101
set 2: multiples of 3 between 1 and 101
set 3: multiples of 4 between 1 and 101
set 4: multiples of 5 between 1 and 101
set 5: multiples of 6 between 1 and 101

2. Find a 2 digit number which is three times the sum of its digits.

3. 76 is divided into 3 parts having a ratio of 12:4:3. What is the product of the largest and smallest parts?

4. Arrange 0, 1, 2, 3 to form a four digit number which is divisible by the first four prime numbers.

Team Questions (continued)

5. Mort's age is $\frac{2}{3}$ Bob's age.
Bob's age is $\frac{2}{3}$ Gordon's age.
The sum of Mort's and Bob's ages is 20.
How old will Gordon be ten years from now?

6. Solve for F:

$$\frac{\frac{D}{B+E-A}}{E} + C = F$$