Category 1
Number Theory
April, 1992

1. _____
2. _____ (eight)
3. _____

1. Express as a standard numeral (decimal notation)

$$34.2 \times 10^{-4}$$

2. Express $100101_{(two)}$ as a base eight numeral.

3. Simplify: $\dfrac{-6\left(12-\left(\frac{1}{3}\right)^{-1}\right)}{\left(\frac{1}{2}\right)^{-3}+8^{0}}$

Category 2
Geometry
April, 1992

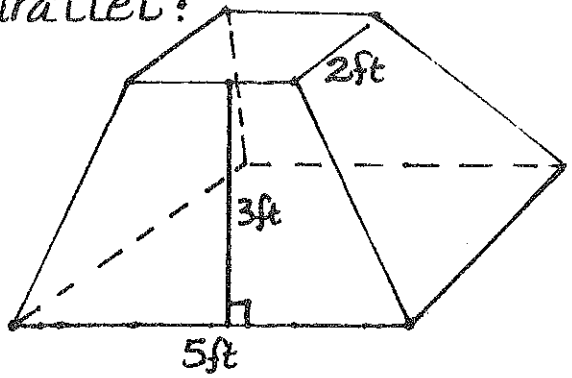
1. _____
2. _____ sq. ft.
3. _____

1. If the length of the edge of a cube is doubled how many times larger will the volume be?

8

2. What is the surface area of this truncated pyramid if both bases are squares and parallel?

Find total surface area.



3. A cylindrical water tank has an inside diameter of 20 ft. and height of 100 ft. If 1 cuft. of water is equal to $7\frac{1}{2}$ gal, how many gallons of water to the nearest gallon will the tank hold? (use $\pi \approx 3.14$)

1225

Category 3
Mystery
April, 1992

1. _____
2. $x =$ _____
3. _____ gal

1. How many positive integral factors does the number 196 have? 9

2. For what value of x is the following equation true?

$$4\sqrt{x-3} + 8 = 8$$ 3

3. A barrel is 1/4 full of oil. When 20 gallons are added, the barrel is 2/3 full. How many more gallons must be added for the barrel to be completely full? 16 gal

Category 4
Arithmetic
April, 1992

1. _____
2. _____
3. _____

1 What is the probability that at least one tail appears in two tosses of a fair coin? (Express as a fraction.) 3/4

2. The scores on a recent math test are listed in the table below. What is the median score? (24 student in the class) 87.5

SCORE	FREQUENCY
100	3
90	9
85	11
60	1

3. The probability that Sam will make a basket on each shot he takes is 2/5. What is the probability that he will miss on three consecutive shots? (Express as a fraction.) 27/125

Category 5
Algebra
April, 1992

1. _____
2. { _____ , _____ }
3. _____ cm

1. If $9x^2 - 48x + C$ is a perfect square what is the value of C ?

2. $(m-1)^2 - (m-1) - 6 = 0$ Solve for m.

3. In a right triangle the length of one leg is 2 cm. shorter than twice the length of the other leg. If the area of the triangle is $132\ cm^2$ what is the length of the longer leg?

Category 6
Team Questions
April, 1992

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

1. How many different 4-digit numbers can be made if no two digits are the same?

2. $101_{(two)} + 101_{(three)} + 101_{(four)} + 101_{(five)} + 101_{(six)} + 101_{(seven)} + 101_{(eight)} + 101_{(nine)} =$ _____ (ten)

3. The edge of one cube is 3cm. longer than the edge of another cube. The difference between their volumes is 513 cm^3. What is the length of the edge of the larger cube?

4. Simplify: $\dfrac{\sqrt{2^9+2^9}}{2^3}$

5. Two marbles are picked from a bag at the the same time. If the bag contained 3 red, 4 green and 5 yellow marbles, what is the probability that one, and only one, is red? (Give answer as a lowest term fraction)

6. $DF + B = \left(\frac{A}{C}\right) / E$

ANSWERS

Apr 92

Cat 1 - NumTh

1. .00342
2. $113_{(eight)}$
3. -6

Cat 2 - Geom

1. 8
2. $7\text{ft}^2\left(25+4+4\left(\frac{1}{2}\right)(5+2)(3)\right)$
3. 235,500 gal. $(3.14\cdot 10^2\cdot 100\cdot 7.5)$

Cat 3 - Mystery

1. 9 $\{1, 2, 4, 7, 14, 28, 49, 98, 196\}$
2. 3
3. 16 gal $\frac{5}{12}x = 20 \quad x = 48$
   $\frac{1}{4}x = 12$

Cat 4 - Arith

HH HT TH TT

1. 3/4
2. 87.5 or $87\frac{1}{2}$
3. $27/125$ $\left(\frac{3}{5}\cdot\frac{3}{5}\cdot\frac{3}{5}\right)$

Cat 5 - Alg.

1. 64
2. $\{-1, 4\}$
3. 22 cm $\frac{1}{2}(2x-2)(x) = 132$
   $x^2 - x - 132 = 0$
   $x = 12$
   $2x - 2 = 22$

Cat 6 - Team

1. $A = 4536$ $9\cdot 9\cdot 8\cdot 7$
2. $B = 292$ $5+10+17+26+37+50+65+82$
3. $C = 9$ $(x+3)^3 - x^3 = 513$
4. $D = 4$ $\sqrt{2\cdot 2^9/2^3} = \sqrt{2^{10}/2^3} = 2^5/2^3 = 4$
5. $E = \frac{9}{22}$ $\frac{1}{4}\cdot\frac{9}{11} + \frac{3}{4}\cdot\frac{3}{11} = \frac{9}{22}$
6. $F = 235$