

Team Test

Fall Classic 2003

1) What is the value of the following:

$$\frac{3}{2} + \frac{5}{2} + \frac{7}{2} + \dots + \frac{201}{2}$$

- a) 4950 b) 5050 c) 5150 d) 6250 e) NOTA

2) To the nearest whole number, how many miles per hour is a car traveling if the wheels are three feet in diameter and turn 400 times a minute?

- a) 42 b) 43 c) 44 d) 45 e) NOTA

3) How many positive three-digit integers less than 400 satisfy each of the following characteristics simultaneously?

- 1) Each of the three digits is prime
- 2) The sum of the three digits is prime
- 3) The number is prime

- a) 3 b) 5 c) 7 d) 9 e) NOTA

4) An integer between 0 and 5000 inclusive is selected at random and is found to be a perfect cube. What is the probability that it is also a perfect fourth power?

- a) $\frac{1}{6}$ b) $\frac{1}{3}$ c) $\frac{1}{5}$ d) $\frac{2}{5}$ e) NOTA

5) A rectangular floor is covered with square tiles. The floor is 81 tiles long and 63 tiles wide. If a diagonal is drawn across the floor, how many tiles will it cross?

- a) 133 b) 135 c) 137 d) 139 e) NOTA

6) What is the sum of all whole numbers between 0 and 1000 that are both perfect squares and perfect cubes?

- a) 812 b) 962 c) 1,034 d) 1,214 e) NOTA

7) When all the diagonals are drawn in a regular octagon, the interior of the octagon is divided into how many regions?

- a) 65 b) 72 c) 80 d) 92 e) NOTA

8) A turn consists of rolling a standard die and tossing a fair coin. The game is won when the die shows a 1 or a 6 and the coin shows heads. What is the probability the game will be won before the fourth turn?

- a) $\frac{83}{216}$ b) $\frac{89}{216}$ c) $\frac{93}{216}$ d) $\frac{97}{216}$ e) NOTA

9) Let $u, v, w, x, y,$ and z be six distinct integers from 1 to 9 inclusive. What is the smallest possible value of $\frac{x}{y} + \frac{u}{v} + \frac{w}{z}$? Express your answer as a decimal rounded to the nearest tenths.

- a) .68 b) .69 c) .72 d) .73 e) NOTA

10) A right rectangular prism is being designed to have a volume of 36 cubic units. Find the minimum possible surface area in square units for the prism if the sides must be of integral length.

- a) 64 b) 66 c) 68 d) 70 e) NOTA

11) The teacher whispers positive integers A to Anna, B to Brett, and C to Chris. The students don't know one another's numbers but they do know that the sum of their numbers is 14. Anna says: "I know that Brett and Chris have different numbers." Then Brett says: "I already knew that all three of our numbers were different." Finally Chris announces: "Now I know all three of our numbers." What is the product ABC?

- a) 54 b) 84 c) 90 d) 36 e) NOTA

12) How many ways are there to write seven-element data lists of integers in numerical order to fit the following criteria: the mean is 20; the median is 21; the mode is 22 and unique; and the range is 10?

- a) 5 b) 6 c) 7 d) 8 e) NOTA

13) An auditorium has 80 rows of seats. The first ten rows each contain 20 seats. After the tenth row, each row has 2 more seats than the previous row. How many seats are there in the auditorium?

- a) 6,570 b) 6,470 c) 6,370 d) 6,270 e) NOTA

14) A developer has 87 acres and he would like to divide it into smaller lots. Some should be 2 acres, some should be 3 acres, and some should be 5 acres. If the developer must have exactly 25 lots (allowing no fractional parts of lots), and at least one lot of each type, in how many different ways can he divide up the 87 acres?

- a) 5 b) 6 c) 7 d) 8 e) NOTA

15) Triangle ABC has vertices A(0,0), B(9,0) and C(9,40). The region enclosed by the triangle is rotated about the line $x = 9$. The solid generated by this rotation is then revolved about the y-axis. How many cubic units are in the volume of the solid generated by the second rotation?

- a) 6480π b) 5860π c) 7240π d) 5820π e) NOTA

16) Find the sum of the digits in the decimal representation of $(789,000,003,450,000)^2$

- a) 72 b) 62 c) 58 d) 54 e) NOTA

17) Each of the first eight prime numbers is placed in a bowl. Two primes are drawn without replacement. What is the probability, expressed as a common fraction, that the sum of the two numbers is a prime number?

- a) $\frac{2}{7}$ b) $\frac{1}{7}$ c) $\frac{1}{14}$ d) $\frac{3}{14}$ e) NOTA

18) Dr. Tosch leased a car for 3 years. The terms of the lease were \$1,200 down and \$299 per month for the length of the lease. In addition, he had to pay \$0.15 per mile for all miles driven in excess of 45,000. What was the total number of dollars in the cost of the lease given that he drove the car 55,240 miles?

- a) \$12,800 b) \$13,200 c) \$13,500 d) \$13,900 e) NOTA

19) Two players take turns in selecting a whole number from 1 to 9 inclusive. As the number is selected it is added to the sum of the other previously selected numbers. The winner is the player who selects the number that yields an exact sum of 127. With the proper strategy, the first player can always win. What number should the first player select on his or her turn to insure the win?

- a) 2 b) 3 c) 6 d) 9 e) NOTA

20) Five robots produce five automobile parts in five minutes. How many packages each containing one part could be made by ten robots in ten hours?

- a) 20 b) 360 c) 1,200 d) 24,000 e) NOTA