10

STATS MEAN MEDIAN MODE

2001

16. **(D)** Since the median is 5, we can write the three numbers as x, 5, and y, where

$$\frac{1}{3}(x+5+y)=x+10 \text{ and } \frac{1}{3}(x+5+y)+15=y.$$

If we add these equations, we get

$$\frac{2}{3}(x+5+y)+15=x+y+10$$

and solving for $x+y$ gives $x+y=25$. Hence the sum of the numbers $x+y+5=30$.

OR

Let m be the mean of the three numbers. Then the least of the numbers is $m-10$ and the greatest is $m+15$. The middle of the three numbers is the median, 5. So

$$\frac{1}{3}((m-10)+5+(m+15))=m$$

and $m=10$. Hence, the sum of the three numbers is $3(10)=30$.

2007B

16. **Answer (C):** Let N be the number of students in the class. Then there are $0.1N$ juniors and $0.9N$ seniors. Let s be the score of each junior. The scores totaled $84N=83(0.9N)+s(0.1N)$, so

$$s=\frac{84N-83(0.9N)}{0.1N}=93.$$

Note: In this problem, we could assume that the class has one junior and nine seniors. Then

$$9\cdot 83+s=10\cdot 84=9\cdot 84+84 \quad \text{and} \quad s=9(84-83)+84=93.$$

2010B

17. **Answer (B):** If there are n schools in the city, then there are $3n$ contestants, so $3n \geq 64$, and $n \geq 22$. Because Andrea received the median score and each student received a different score, n is odd, so $n \geq 23$. Andrea's position is $\frac{3n+1}{2}$, and Andrea finished ahead of Beth, so $\frac{3n+1}{2} < 37$, and $3n < 73$. Because n is an odd integer, $n \leq 23$. Therefore $n = 23$.

2005B

19. **(B)** The percentage of students getting 95 points is

$$100 - 10 - 25 - 20 - 15 = 30,$$

so the mean score on the exam is

$$0.10(70) + 0.25(80) + 0.20(85) + 0.15(90) + 0.30(95) = 86.$$

Since fewer than half of the scores were less than 85, and fewer than half of the scores were greater than 85, the median score is 85. The difference between the mean and the median score on this exam is $86 - 85 = 1$.

2005B

20. **(C)** Each digit appears the same number of times in the 1's place, the 10's place, ..., and the 10,000's place. The average of the digits in each place is

$$\frac{1}{5}(1+3+5+7+8) = \frac{24}{5} = 4.8.$$

Hence the average of all the numbers is

$$4.8(1 + 10 + 100 + 1000 + 10000) = 4.8(11111) = 53332.8.$$