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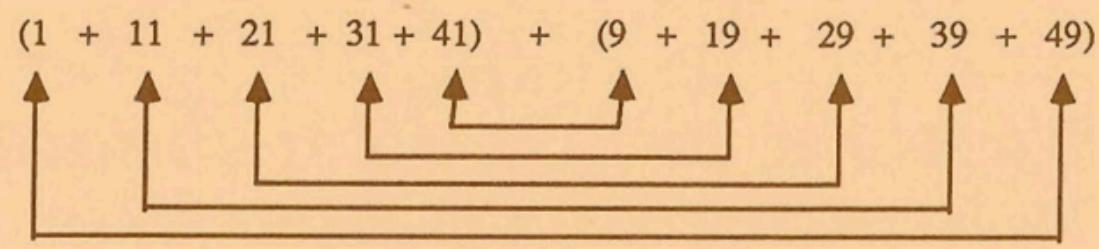
1. $(1+11+21+31+41) + (9+19+29+39+49) =$

A) 150 B) 199 C) 200 D) 249 E) 250

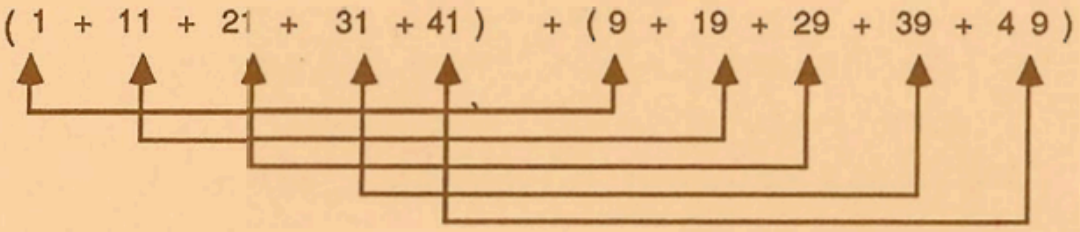
1989 Q1

1. E The sum is $5(50) = 250$ as can be seen by grouping the sum as shown.



OR

The sum is $10+30+50+70+90 = 250$ as can be seen by grouping the sum as shown.



2 / 8

1. $\dfrac{10-9+8-7+6-5+4-3+2-1}{1-2+3-4+5-6+7-8+9} =$

(A) -1 (B) 1 (C) 5 (D) 9 (E) 10

1992 Q1

1. **(B)** Group the numerator in pairs from the left, and group the denominator in pairs from the left:

$$\frac{\overbrace{10-9}^{1}+\overbrace{8-7}^{1}+\overbrace{6-5}^{1}+\overbrace{4-3}^{1}+\overbrace{2-1}^{1}}{\underbrace{1-2}_{-1}+\underbrace{3-4}_{-1}+\underbrace{5-6}_{-1}+\underbrace{7-8}_{-1}+9}$$

Hence, the answer is $\frac{5(1)}{4(-1)+9}=\frac{5}{5}=1.$

OR

Regroup the numerator and denominator into positive and negative terms,

$$\frac{(10+8+6+4+2)-(9+7+5+3+1)}{(1+3+5+7+9)-(2+4+6+8)}=\frac{30-25}{25-20}=\frac{5}{5}=1.$$

1985 Q2

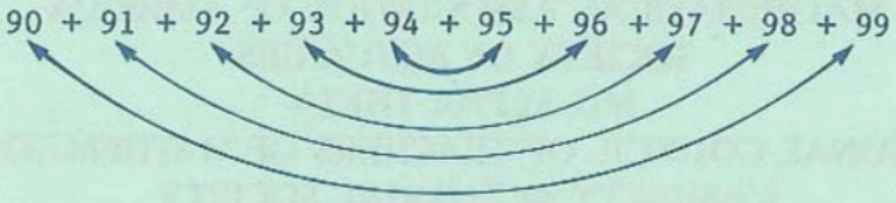
2. 90 + 91 + 92 + 93 + 94 + 95 + 96 + 97 + 98 + 99 =

A) 845 B) 945 C) 1005 D) 1025 E) 1045

2. (B) By estimating, we see that the desired sum is between $10 \times 90 = 900$ and $10 \times 100 = 1000$, so it must be 945.

OR

Pair the numbers as shown. The sum of each pair is 189, so the desired sum is $5 \times 189 = 945$.



1994 Q2

2. $\frac{1}{10} + \frac{2}{10} + \frac{3}{10} + \frac{4}{10} + \frac{5}{10} + \frac{6}{10} + \frac{7}{10} + \frac{8}{10} + \frac{9}{10} + \frac{55}{10} =$

(A) $4\frac{1}{2}$ **(B)** 6.4 **(C)** 9 **(D)** 10 **(E)** 11

2. **(D)** The sum of all the numerators is 100. Consequently, the sum of all the fractions is $100/10 = 10$.

OR

Regroup the fractions before adding:

$$\left(\frac{1}{10} + \frac{9}{10}\right) + \left(\frac{2}{10} + \frac{8}{10}\right) + \left(\frac{3}{10} + \frac{7}{10}\right) + \left(\frac{4}{10} + \frac{6}{10}\right) + \left(\frac{5}{10} + \frac{55}{10}\right) =$$

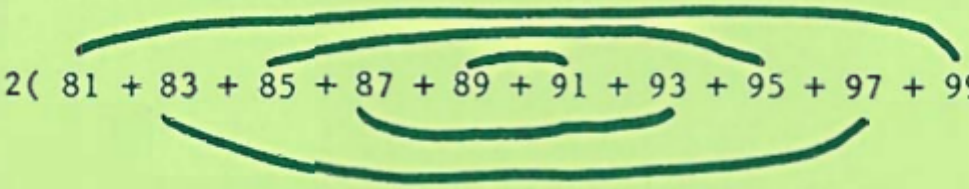
$1 + 1 + 1 + 1 + 6 = 10.$

3, $2(81 + 83 + 85 + 87 + 89 + 91 + 93 + 95 + 97 + 99) =$

A) 1600 B) 1650 C) 1700 D) 1750 E) 1800

1987 Q3

3. E Pairing the addends as shown, we see the desired product is (2)(5)(180) = 1800.



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2013 Q3

3. What is the value of $4 \cdot (-1 + 2 - 3 + 4 - 5 + 6 - 7 + \cdots + 1000)$?

(A) -10 **(B)** 0 **(C)** 1 **(D)** 500 **(E)** 2000

3. **Answer (E):** Inside the parentheses are 500 pairs of numbers, each with a sum of 1. Therefore the expression equals $4 \cdot 500 = 2000$.

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4. $\dfrac{2+4+6+\cdots+34}{3+6+9+\cdots+51} =$

(A) $\frac{1}{3}$ **(B)** $\frac{2}{3}$ **(C)** $\frac{3}{2}$ **(D)** $\frac{17}{3}$ **(E)** $\frac{34}{3}$

1996 Q4

4. (B) $\dfrac{2+4+6+\cdots+34}{3+6+9+\cdots+51} = \dfrac{2(1+2+3+\cdots+17)}{3(1+2+3+\cdots+17)} = \dfrac{2}{3}$.

1991 Q4

4. If $991+993+995+997+999 = 5000-N$, then $N =$

(A) 5 (B) 10 (C) 15 (D) 20 (E) 25

4. (E) Each of the five numbers on the left side of the equation is approximately equal to 1,000. Thus N can be found by computing the difference between 1,000 and each number, so $N = 9+7+5+3+1 = 25$.

OR

Since
$$\begin{aligned} &991 + 993 + 995 + 997 + 999 \\ &= (1000-9)+(1000-7)+(1000-5)+(1000-3)+(1000-1) \\ &= 5000-(9+7+5+3+1) = 5000-25, \end{aligned}$$

it follows that $N = 25$.