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2019 小學數學競賽選拔賽初賽試題

第一試：計算題（考試時間 1 小時）

◎請將答案填入答案卷對應題號的空格內，不須計算過程。答案若為分數請化為最簡分數。本題目卷正反面空白處可為作演算草稿紙。每題 5 分，共 100 分

1. $11+18+23+27+42+59=?$

$$=(11+59)+(18+42)+(23+27)=70+60+50=180$$

2. $15\times 25=?$

【算法 1】

$$=3\times 5\times 25=3\times 125=375$$

【算法 2】

$$=5\times 3\times 25=5\times 75=375$$

【算法 3】

$$=(16-1)\times 25=16\times 25-25=4\times 4\times 25-25=4\times 100-25=400-25=375$$

【算法 4】

$$=(20-5)\times (20+5)=20\times 20-5\times 5=400-25=375$$

3. $12\frac{1}{2}\times 2019\times 8\times \frac{3.14}{20.19}=?$

$$=8\times 12.5\times 2019\times \frac{3.14}{20.19}=100\times 100\times 3.14=31400$$

4. $1+902+8003+70004+600005=?$

$$=1+(900+2)+(8000+3)+(70000+4)+(600000+5)$$

$$=(900+8000+70000+600000)+(1+2+3+4+5)$$

$$=678900+15$$

$$=678915$$

5. $656565\div 13\div 15=?$

$$=65\times 10101\div 13\div 5\div 3$$

$$=65\times 10101\div 65\div 3$$

$$=10101\div 3$$

$$=3367$$

6. $(169-5\times 5)\div 3\times 0.25=?$

$$=(169-25)\div 3\times \frac{1}{4}=144\div 3\times \frac{1}{4}=48\times \frac{1}{4}=12$$

7. $3.17+5.17+7.17+9.17+11.17+13.17+15.17+17.17+19.17+21.17=?$

【算法 1】

$$=\frac{(3.17+21.17)\times 10}{2}=\frac{24.34\times 10}{2}=\frac{243.4}{2}=121.7=121\frac{7}{10}=\frac{1217}{10}$$

【算法 2】

$$= (3+5+7+9+11+13+15+17+19+21) + 0.17 \times 10$$

$$= \frac{(3+21) \times 10}{2} + 1.7$$

$$= 120 + 1.7$$

$$= 121.7 = 121 \frac{7}{10} = \frac{1217}{10}$$

8. $2019 - 1 - 3 - 5 - 7 - 9 - \dots - 85 - 87 = ?$

$$= 2019 - (1 + 3 + 5 + 7 + \dots + 85 + 87)$$

$$= 2019 - \frac{(1+87) \times 44}{2}$$

$$= 2019 - 44 \times 44$$

$$= 2019 - 1936$$

$$= 83$$

9. $1 - \frac{1}{3} - \frac{1}{6} - \frac{1}{12} - \frac{1}{24} - \frac{1}{48} - \frac{1}{96} - \frac{1}{192} = ?$

$$= \frac{192 - 64 - 32 - 16 - 8 - 4 - 2 - 1}{192}$$

$$= \frac{192 - (1 + 2 + 4 + 8 + 16 + 32 + 64)}{192} = \frac{192 - 127}{192} = \frac{65}{192}$$

10. $14 + 47 + 70 + 3 + 36 + 69 + 92 + 25 + 58 + 81 = ?$

$$= (4 + 7 + 0 + 3 + 6 + 9 + 2 + 5 + 8 + 1) + 10 \times (1 + 4 + 7 + 3 + 6 + 9 + 2 + 5 + 8)$$

$$= (1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9) \times (1 + 10)$$

$$= 45 \times 11$$

$$= 495$$

11. $9.1 + 8.11 + 7.111 + 6.1111 + 5.11111 + 4.111111 + 3.1111111 + 2.11111111 + 1.111111111 = ?$

$$= (9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1) + (0.1 + 0.11 + 0.111 + 0.1111 + 0.11111 + 0.111111 + 0.1111111 + 0.11111111 + 0.111111111)$$

$$= 45 + 0.987654321$$

$$= 45.987654321$$

12. $995 \times 995 + 995 \times 116 + 116 \times 995 + 116 \times 116 = ?$

【算法 1】

$$= 995 \times (995 + 116) + 116 \times (995 + 116)$$

$$= (995 + 116) \times (995 + 116)$$

$$= 1111 \times 1111$$

$$= 1234321$$

【算法 2】

$$= 995^2 + 2 \times 995 \times 116 + 116^2 = (995 + 116)^2 = 1111^2 = 1234321$$

$$\begin{aligned}
 13. \quad & \frac{20 \times 19 \times 18 \times 17 \times 16 \times 15 \times 14 \times 13 \times 12 \times 11}{3 \times 5 \times 7 \times 9 \times 11 \times 13 \times 15 \times 17 \times 19} = ? \\
 &= \frac{20 \times 18 \times 16 \times 14 \times 12}{3 \times 5 \times 7 \times 9} \\
 &= \frac{(4 \times 5) \times (2 \times 9) \times 16 \times (2 \times 7) \times (3 \times 4)}{3 \times 5 \times 7 \times 9} \\
 &= 4 \times 2 \times 16 \times 2 \times 4 \\
 &= 1024
 \end{aligned}$$

$$\begin{aligned}
 14. \quad & \frac{\frac{9}{28} \times 3\frac{1}{2} + \frac{1}{6}}{8\frac{1}{3} \div \frac{5}{7} - 5\frac{7}{8}} \div \frac{31}{8} = ? \\
 &= \frac{\frac{9}{28} \times \frac{7}{2} + \frac{1}{6}}{\frac{3}{5} \times \frac{7}{7} - \frac{47}{8}} \times \frac{8}{31} = \frac{\frac{9}{4} \times \frac{1}{2} + \frac{1}{6}}{\frac{3}{5} \times 7 - \frac{47}{8}} \times \frac{8}{31} = \frac{\frac{9}{8} + \frac{1}{6}}{\frac{35}{5} - \frac{47}{8}} \times \frac{8}{31} = \frac{\frac{27+4}{24}}{\frac{280-141}{24}} \times \frac{8}{31} = \frac{31}{139} \times \frac{8}{31} = \frac{8}{139}
 \end{aligned}$$

$$\begin{aligned}
 15. \quad & 20192019 \times 9999 + 99999 \times 20192019 - 2019 \times 99989998 = ? \\
 &= 20192019 \times 9999 + 20192019 \times 99999 - 2019 \times 9998 \times 10001 \\
 &= 20192019 \times 9999 + 20192019 \times 99999 - 9998 \times 20192019 \\
 &= 20192019 \times 9999 - 20192019 \times 9998 + 20192019 \times 99999 \\
 &= 20192019 + 20192019 \times 99999 \\
 &= 20192019 \times (1 + 99999) \\
 &= 2019201900000
 \end{aligned}$$

$$\begin{aligned}
 16. \quad & (1 - \frac{1}{11} \times \frac{1}{11}) \times (1 - \frac{1}{12} \times \frac{1}{12}) \times (1 - \frac{1}{13} \times \frac{1}{13}) \times \cdots \times (1 - \frac{1}{120} \times \frac{1}{120}) = ? \\
 &= (1 - \frac{1}{11}) \times (1 + \frac{1}{11}) \times (1 - \frac{1}{12}) \times (1 + \frac{1}{12}) \times (1 - \frac{1}{13}) \times (1 + \frac{1}{13}) \times \cdots \times (1 - \frac{1}{120}) \times (1 + \frac{1}{120}) \\
 &= \frac{10}{11} \times \frac{12}{11} \times \frac{11}{12} \times \frac{13}{12} \times \frac{12}{13} \times \frac{14}{13} \times \cdots \times \frac{119}{120} \times \frac{121}{120} \\
 &= \frac{10}{11} \times \frac{121}{120} \\
 &= \frac{11}{12}
 \end{aligned}$$

$$\begin{aligned}
17. \quad & 131\frac{2}{11} \times \frac{11}{13} + 111\frac{2}{9} \times \frac{9}{11} + 91\frac{2}{7} \times \frac{7}{9} + 71\frac{2}{5} \times \frac{5}{7} + 51\frac{2}{3} \times \frac{3}{5} = ? \\
& = \left(\frac{11 \times 131 + 2}{11}\right) \times \frac{11}{13} + \left(\frac{9 \times 111 + 2}{9}\right) \times \frac{9}{11} + \left(\frac{7 \times 91 + 2}{7}\right) \times \frac{7}{9} + \left(\frac{5 \times 71 + 2}{5}\right) \times \frac{5}{7} \\
& \quad + \left(\frac{3 \times 51 + 2}{3}\right) \times \frac{3}{5} \\
& = \frac{11 \times 131 + 2}{13} + \frac{9 \times 111 + 2}{11} + \frac{7 \times 91 + 2}{9} + \frac{5 \times 71 + 2}{7} + \frac{3 \times 51 + 2}{5} \\
& = \frac{11 \times (130 + 1) + 2}{13} + \frac{9 \times (110 + 1) + 2}{11} + \frac{7 \times (90 + 1) + 2}{9} + \frac{5 \times (70 + 1) + 2}{7} + \frac{3 \times (50 + 1) + 2}{5} \\
& = \frac{11 \times 130 + 13}{13} + \frac{9 \times 110 + 11}{11} + \frac{7 \times 90 + 9}{9} + \frac{5 \times 70 + 7}{7} + \frac{3 \times 50 + 5}{5} \\
& = 111 + 91 + 71 + 51 + 31 \\
& = 355
\end{aligned}$$

$$\begin{aligned}
18. \quad & 11 + 13\frac{4}{15} + 15\frac{4}{35} + 17\frac{4}{63} + 19\frac{4}{99} + 21\frac{4}{143} = ? \\
& = 11 + 13 + 15 + 17 + 19 + 21 + \frac{4}{3 \times 5} + \frac{4}{5 \times 7} + \frac{4}{7 \times 9} + \frac{4}{9 \times 11} + \frac{4}{11 \times 13} \\
& = 96 + 2 \times \left(\frac{2}{3 \times 5} + \frac{2}{5 \times 7} + \frac{2}{7 \times 9} + \frac{2}{9 \times 11} + \frac{2}{11 \times 13}\right) \\
& = 96 + 2 \times \left(\frac{1}{3} - \frac{1}{5} + \frac{1}{5} - \frac{1}{7} + \frac{1}{7} - \frac{1}{9} + \frac{1}{9} - \frac{1}{11} + \frac{1}{11} - \frac{1}{13}\right) \\
& = 96 + 2 \times \left(\frac{1}{3} - \frac{1}{13}\right) \\
& = 96 + 2 \times \frac{10}{39} \\
& = 96\frac{20}{39}
\end{aligned}$$

$$\begin{aligned}
19. \quad & \frac{2.71828}{2.019 \times 2.019 - 1.019 \times 3.019} = ? \\
& = \frac{2.71828}{2.019 \times 2.019 - (2.019 - 1) \times (2.019 + 1)} \\
& = \frac{2.71828}{2.019 \times 2.019 - 2.019 \times 2.019 + 1 \times 1} \\
& = \frac{2.71828}{1} \\
& = 2.71828
\end{aligned}$$

$$\begin{aligned}
20. \quad & \frac{(1 + 2019) \times (1 + \frac{2019}{2}) \times (1 + \frac{2019}{3}) \times (1 + \frac{2019}{4}) \times \cdots \times (1 + \frac{2019}{100}) \times (1 + \frac{2019}{101})}{(1 + 2020) \times (1 + \frac{2020}{2}) \times (1 + \frac{2020}{3}) \times (1 + \frac{2020}{4}) \times \cdots \times (1 + \frac{2020}{99}) \times (1 + \frac{2020}{100})} = ? \\
& = \frac{(1 + 2019) \times (\frac{2 + 2019}{2}) \times (\frac{3 + 2019}{3}) \times (\frac{4 + 2019}{4}) \times \cdots \times (\frac{100 + 2019}{100}) \times (\frac{101 + 2019}{101})}{(1 + 2020) \times (\frac{2 + 2020}{2}) \times (\frac{3 + 2020}{3}) \times (\frac{4 + 2020}{4}) \times \cdots \times (\frac{100 + 2020}{100})} \\
& = \frac{2020 \times 2021 \times 2022 \times \cdots \times 2118 \times 2119 \times \frac{2120}{101}}{2021 \times 2022 \times 2023 \times \cdots \times 2120} \\
& = 2020 \times \frac{1}{101} \\
& = 20
\end{aligned}$$