

注意：

允許學生個人、非營利性的圖書館或公立學校合理使用本基金會網站所提供之各項試題及其解答。可直接下載而不須申請。

重版、系統地複製或大量重製這些資料的任何部分，必須獲得財團法人臺北市九章數學教育基金會的授權許可。

申請此項授權請電郵 ccmp@seed.net.tw

Notice:

Individual students, nonprofit libraries, or schools are permitted to make fair use of the papers and its solutions. Republication, systematic copying, or multiple reproduction of any part of this material is permitted only under license from the Chiuchang Mathematics Foundation.

Requests for such permission should be made by e-mailing Mr. Wen-Hsien SUN ccmp@seed.net.tw

2016 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

- $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 25 \times 125 = ?$
 $= (2 \times 5) \times (2 \times 2 \times 25) \times (2 \times 2 \times 2 \times 125) \times 2 = 10 \times 100 \times 1000 \times 2 = 2000000$
- $5 + 10 + 15 + 20 + 25 + \dots + 300 + 305 + 310 + 315 = ?$
 $= \frac{(5 + 315) \times 63}{2} = 10080$
- $10.08 + 20.16 + 30.32 + 40.64 + 51.28 - 8.07 - 12.15 - 16.31 - 20.63 - 25.27 = ?$
 $= (10 + 20 + 30 + 40 + 51 - 8 - 12 - 16 - 20 - 25)$
 $+ (0.08 - 0.07 + 0.16 - 0.15 + 0.32 - 0.31 + 0.64 - 0.63 + 0.28 - 0.27)$
 $= 70 + 0.05$
 $= 70.05$
- $167 \times 399 + 167 \times 399 + 167 \times 399 + 167 \times 399 + 167 \times 399 + 167 \times 399 = ?$
 $= 167 \times 399 \times 6 = 167 \times 6 \times 399 = 1002 \times 399 = 399798$
- $164 + 164 \times 3 + 164 \times 5 + 164 \times 7 + 164 \times 9 + 164 \times 11 = ?$
 $= 164 \times (1 + 3 + 5 + 7 + 9 + 11) = 164 \times 36 = (100 + 64) \times (100 - 64)$
 $= 100^2 - 64^2 = 10000 - 4096 = 5904$
- $135789 + 357891 + 578913 + 789135 + 891357 + 913578 = ?$
 $= (1 + 3 + 5 + 7 + 8 + 9) \times 111111 = 33 \times 111111 = 3666663$
- $201.6 \times 7.8 \div 9 \times 3 \div 67.2 \times 5 \div 3.9 = ?$
 $= 67.2 \times 3 \times 7.8 \div 9 \times 3 \div 67.2 \times 5 \div 3.9$
 $= 67.2 \div 67.2 \times 3 \times 3 \div 9 \times 7.8 \div 3.9 \times 5 = 2 \times 5 = 10$
- $2016 + 2015 + 2014 + \dots + 1010 + 1009 - 1008 - 1007 - \dots - 3 - 2 - 1 = ?$

【參考解法 1】

$$\begin{aligned} &= (2016 - 1008) + (2015 - 1007) + (2014 - 1006) + \dots + (1010 - 2) + (1009 - 1) \\ &= \underbrace{1008 + 1008 + \dots + 1008 + 1008}_{1008 \text{項}} \\ &= 1008 \times 1008 = 1016064 \end{aligned}$$

【參考解法 2】

$$\begin{aligned} &= (2016 + 2015 + 2014 + \dots + 2 + 1) - 2 \times (1008 + 1007 + \dots + 2 + 1) \\ &= \frac{(2016 + 1) \times 2016}{2} - 2 \times \frac{(1008 + 1) \times 1008}{2} \\ &= 1008 \times (2017 - 1009) \\ &= 1008 \times 1008 = 1016064 \end{aligned}$$

$$\begin{aligned}
9. \quad & 954 \times 954 - 504 \times 504 - 450 \times 450 = ? \\
& = (954 + 504) \times (954 - 504) - 450 \times 450 \\
& = 1458 \times 450 - 450 \times 450 \\
& = (1458 - 450) \times 450 \\
& = 1008 \times 450 = 453600
\end{aligned}$$

$$\begin{aligned}
10. \quad & 2016 \times 7777 + 672 \times 6666 = ? \\
& = 2016 \times 7777 + 672 \times 3 \times 2222 \\
& = 2016 \times 7777 + 2016 \times 2222 \\
& = 2016 \times (7777 + 2222) \\
& = 2016 \times (10000 - 1) \\
& = 20160000 - 2016 \\
& = 20157984
\end{aligned}$$

$$\begin{aligned}
11. \quad & \frac{1 \times 3 \times 6 \times 10 + 4 \times 12 \times 24 \times 40 + 7 \times 21 \times 42 \times 70 + 10 \times 30 \times 60 \times 100}{2 \times 5 \times 7 \times 11 + 8 \times 20 \times 28 \times 44 + 14 \times 35 \times 49 \times 77 + 20 \times 50 \times 70 \times 110} = ? \\
& = \frac{1 \times 3 \times 6 \times 10 \times (1 + 4 + 7 + 10)}{2 \times 5 \times 7 \times 11 \times (1 + 4 + 7 + 10)} = \frac{1 \times 3 \times 6 \times 10}{2 \times 5 \times 7 \times 11} = \frac{18}{77}
\end{aligned}$$

$$\begin{aligned}
12. \quad & 20.16 \times 20.16 + 79.84 \times 120.16 = ? \\
& = 20.16 \times 20.16 + 79.84 \times (20.16 + 100) \\
& = 20.16 \times 20.16 + 79.84 \times 20.16 + 7984 \\
& = 20.16 \times (20.16 + 79.84) + 7984 \\
& = 20.16 \times 100 + 7984 \\
& = 2016 + 7984 = 10000
\end{aligned}$$

$$\begin{aligned}
13. \quad & 28.8 \times 199.99 - 2.88 \times 1999.6 - 0.288 \times 1.9993 = ? \\
& = 288 \times (0.1 \times 199.99 - 0.01 \times 1999.6 - 0.001 \times 1.9993) \\
& = 288 \times (19.999 - 19.996 - 0.0019993) \\
& = 288 \times 0.0010007 = 0.2882016
\end{aligned}$$

$$\begin{aligned}
14. \quad & 21 \frac{1}{16} + (5 \times 2 \frac{1}{7} - 4 \div \frac{1}{3}) \div \frac{1}{7} + 0.9375 = ? \\
& = 21 \frac{1}{16} + (5 \times \frac{15}{7} - 12) \div \frac{1}{7} + \frac{15}{16} = 22 - (\frac{84}{7} - \frac{75}{7}) \times 7 = 22 - \frac{9}{7} \times 7 = 13
\end{aligned}$$

$$\begin{aligned}
15. \quad & \frac{1169}{1690} \times 1 \frac{214}{501} \div 8 \frac{89}{114} = ? \\
& = \frac{1169}{1690} \times \frac{715}{501} \div \frac{1001}{114} \\
& = \frac{1169}{1690} \times \frac{715}{501} \times \frac{114}{1001} = \frac{7 \times 167}{2 \times 5 \times 13 \times 13} \times \frac{5 \times 11 \times 13}{3 \times 167} \times \frac{2 \times 3 \times 19}{7 \times 11 \times 13} = \frac{19}{13 \times 13} = \frac{19}{169}
\end{aligned}$$

$$16. 2015 \times \frac{2015}{2016} + 2016 \times \frac{2016}{2017} - \frac{4033}{2016 \times 2017} = ?$$

$$= 2015 \times \left(1 - \frac{1}{2016}\right) + 2016 \times \left(1 - \frac{1}{2017}\right) - \left(\frac{2016 + 2017}{2016 \times 2017}\right)$$

$$= 2015 - \frac{2015}{2016} + 2016 - \frac{2016}{2017} - \frac{1}{2017} - \frac{1}{2016}$$

$$= 2015 + 2016 - 2 = 4029$$

$$17. 91 + 929 + 9399 + 94999 + 959999 + 9699999 + 97999999 + 989999999 = ?$$

$$= (90 + 2 - 1) + (900 + 30 - 1) + (9000 + 400 - 1) + (90000 + 5000 - 1)$$

$$+ (900000 + 60000 - 1) + (9000000 + 700000 - 1) + (90000000 + 8000000 - 1)$$

$$+ (900000000 + 90000000 - 1)$$

$$= 90 + 900 + 9000 + 90000 + 900000 + 9000000 + 90000000 + 900000000$$

$$+ 2 + 30 + 400 + 5000 + 60000 + 700000 + 80000000 + 900000000 - 8$$

$$= 999999990 + 98765432 - 8$$

$$= 1000000000 - 10 + 98765432 - 8$$

$$= 1098765432 - 18$$

$$= 1098765414$$

$$18. \frac{1}{1 \times 2} - \frac{2}{1 \times 2 \times 4} + \frac{14}{1 \times 2 \times 4 \times 8} - \frac{30}{1 \times 2 \times 4 \times 8 \times 16} + \frac{62}{1 \times 2 \times 4 \times 8 \times 16 \times 32} = ?$$

$$= \frac{4}{1 \times 2 \times 4} - \frac{2}{1 \times 2 \times 4} + \frac{14}{1 \times 2 \times 4 \times 8} - \frac{30}{1 \times 2 \times 4 \times 8 \times 16} + \frac{62}{1 \times 2 \times 4 \times 8 \times 16 \times 32}$$

$$= \frac{2}{1 \times 2 \times 4} - \frac{14}{1 \times 2 \times 4 \times 8} + \frac{30}{1 \times 2 \times 4 \times 8 \times 16} - \frac{62}{1 \times 2 \times 4 \times 8 \times 16 \times 32}$$

$$= \frac{16}{1 \times 2 \times 4 \times 8} - \frac{14}{1 \times 2 \times 4 \times 8} + \frac{30}{1 \times 2 \times 4 \times 8 \times 16} - \frac{62}{1 \times 2 \times 4 \times 8 \times 16 \times 32}$$

$$= \frac{2}{1 \times 2 \times 4 \times 8} - \frac{30}{1 \times 2 \times 4 \times 8 \times 16} + \frac{62}{1 \times 2 \times 4 \times 8 \times 16 \times 32}$$

$$= \frac{32}{1 \times 2 \times 4 \times 8 \times 16} - \frac{30}{1 \times 2 \times 4 \times 8 \times 16} + \frac{62}{1 \times 2 \times 4 \times 8 \times 16 \times 32}$$

$$= \frac{2}{1 \times 2 \times 4 \times 8 \times 16} - \frac{62}{1 \times 2 \times 4 \times 8 \times 16 \times 32}$$

$$= \frac{64}{1 \times 2 \times 4 \times 8 \times 16 \times 32} - \frac{62}{1 \times 2 \times 4 \times 8 \times 16 \times 32}$$

$$= \frac{2}{1 \times 2 \times 4 \times 8 \times 16 \times 32}$$

$$= \frac{1}{2^{14}} = \frac{1}{16384} = 2^{-14}$$

$$\begin{aligned}
 19. \quad & \left(20 \frac{485359}{999999} - \frac{323}{999}\right) \div 10 \frac{81018}{999999} = ? \\
 & = \left(\frac{20485339}{999999} - \frac{323323}{999999}\right) \div \frac{10081008}{999999} \\
 & = \frac{20162016}{999999} \times \frac{999999}{10081008} \\
 & = \frac{20162016}{10081008} \\
 & = 2
 \end{aligned}$$

$$20. \quad \frac{33 \times 27 - 22 \times 18 + 9 - 4}{125 + \frac{(33 \times 27 - 22 \times 18 + 9 - 4)}{9 - \frac{(33 \times 27 - 22 \times 18 + 9 - 4)}{75 + \frac{(33 \times 27 - 22 \times 18 + 9 - 4)}{30 - \frac{(33 \times 27 - 22 \times 18 + 9 - 4)}{48 + \frac{(33 \times 27 - 22 \times 18 + 9 - 4)}{250}}}}} = ?$$

$$\begin{aligned}
 \text{因 } 33 \times 27 - 22 \times 18 + 9 - 4 &= (30 + 3) \times (30 - 3) + 9 - (20 + 2) \times (20 - 2) - 4 \\
 &= 30^2 - 3^2 + 9 - 20^2 + 2^2 - 4 \\
 &= 30^2 - 20^2 \\
 &= 500
 \end{aligned}$$

故知原式等價於

$$\begin{aligned}
 & \frac{500}{125 + \frac{500}{9 - \frac{500}{75 + \frac{500}{30 - \frac{500}{48 + \frac{500}{250}}}}} = \frac{500}{125 + \frac{500}{9 - \frac{500}{75 + \frac{500}{30 - \frac{500}{48 + 2}}}}} = \frac{500}{125 + \frac{500}{9 - \frac{500}{75 + \frac{500}{30 - \frac{500}{50}}}}} \\
 & = \frac{500}{125 + \frac{500}{9 - \frac{500}{75 + \frac{500}{30 - 10}}}} = \frac{500}{125 + \frac{500}{9 - \frac{500}{75 + \frac{500}{20}}}} \\
 & = \frac{500}{125 + \frac{500}{9 - \frac{500}{75 + 25}}} = \frac{500}{125 + \frac{500}{9 - \frac{500}{100}}} = \frac{500}{125 + \frac{500}{9 - 5}} \\
 & = \frac{500}{125 + \frac{500}{4}} = \frac{500}{125 + 125} = \frac{500}{250} = 2
 \end{aligned}$$