



主辦

## 小學數學精英大賽 2015/16

### 詳盡答案

### Full Solution

#### 甲部

#### Part A

1.  $142857 \times 7 = 999999$

$$\begin{aligned} \therefore (142857 + 142857) \times 7 \div 9 \\ = (99999 + 99999) \div 9 \\ = 222222 \end{aligned}$$

2. 被除數所有數字之和是 9 的倍數，且所有數字為雙數，故可被 18 除盡，餘數為 0。

2. The sum of the digits in the dividend is a multiple of 9 and all the digits are even numbers, so the dividend is divisible by 18 and the remainder is 0.

3.  $33 \div 0.375 \times 52 + 44 \times 96$

$$\begin{aligned} &= 33 \div \frac{3}{8} \times 52 + 44 \times 96 \\ &= 88 \times 52 + 44 \times 96 \\ &= 88 \times 52 + 88 \times 48 \\ &= 88 \times (52 + 48) \\ &= 8800 \end{aligned}$$

4.  $1\frac{1}{2} + 3\frac{1}{12} + 2\frac{1}{6} + 5\frac{1}{30} + 4\frac{1}{20}$

$$\begin{aligned} &= (1 + 2 + 3 + 4 + 5) + \left(\frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30}\right) \\ &= 15 + \left(1 - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \frac{1}{3} - \frac{1}{4} + \frac{1}{4} - \frac{1}{5} + \frac{1}{5} - \frac{1}{6}\right) \\ &= 15\frac{5}{6} \end{aligned}$$

$$\begin{aligned}
5. \quad & 0.5 \times 0.8 \times 0.875 \times \frac{2}{3} \times \frac{6}{7} \\
& = \frac{1}{2} \times \frac{2}{3} \times \frac{4}{5} \times \frac{6}{7} \times \frac{7}{8} \\
& = \frac{1}{5}
\end{aligned}$$

$$\begin{aligned}
6. \quad & 9869864004 \div 7 \div 11 \div 13 \\
& = 9869864004 \div (7 \times 11 \times 13) \\
& = 9869864004 \div 1001 \\
& = 9860004
\end{aligned}$$

$$\begin{aligned}
7. \quad & 3\Delta(2\Delta Y) = 10.5 \\
& 2\Delta Y = 24 \\
& Y = 50
\end{aligned}$$

$$\begin{aligned}
8. \quad & \frac{8888 \times 2 + 6666 \times 5 + 7777 \times 3 - 1111}{4444 \times 4 + 5555 \times 9 + 1111 \times 5} \\
& = \frac{16 + 30 + 21 - 1}{16 + 45 + 5} \\
& = \frac{66}{66} \\
& = 1
\end{aligned}$$

$$\begin{aligned}
9. \quad & 9604 \\
& = 98 \times 98 \\
& = (98 - 1) \times (98 + 1) + 1 \\
& = 97 \times 99 + 1 \\
& \text{兩數為 } 97 \text{ 和 } 99。
\end{aligned}$$

$$\begin{aligned}
9. \quad & 9604 \\
& = 98 \times 98 \\
& = (98 - 1) \times (98 + 1) + 1 \\
& = 97 \times 99 + 1 \\
& \text{The two odd numbers are } 97 \text{ and } 99.
\end{aligned}$$

$$\begin{aligned}
10. \quad & 2016 \times \left( 33\frac{1}{3}\% + \frac{1}{6} \right) + 1008 \times \left( 0.002 + \frac{499}{500} \right) \\
& = 2016 \times \left( \frac{1}{3} + \frac{1}{6} \right) + 1008 \times 1 \\
& = 2016
\end{aligned}$$

## 乙部

### Part B

11. 所有觀眾有： $48 \div 10\% = 480$  (人)  
下半場剩下觀眾有： $480 - 48 = 432$  (人)  
下半場剩下男觀眾有：  
 $432 \div 160\% \times 60\% = 162$  (人)  
女觀眾有： $432 - 162 = 270$  (人)

11.  $48 \div 10\% = 480$   
The total audience was 480.  
 $480 - 48 = 432$   
The audience in the second part was 432.  
 $432 \div 160\% \times 60\% = 162$   
162 people remained in the audience were male.  
 $432 - 162 = 270$   
270 people were female.

12. 平均速率是： $\frac{26}{\frac{13}{60} + \frac{13}{90}} = 72$  (km/h)

12.  $\frac{26}{\frac{13}{60} + \frac{13}{90}} = 72$

The average speed is 72 km/h.

13.



先確定在 1000 米及 910 米處重疊。所有相交點為 1000, 910, 820, 730, ..., 10。

$$\frac{1000 - 10}{90} + 1 = 12$$

共在 12 處地方重疊。

First, we find that a tree and a streetlight are overlapped at 1000-m and 910-m points.

Then list the overlapping points:

1000, 910, 820, 730, ..., 10.

$$\frac{1000 - 10}{90} + 1 = 12$$

The number of overlapping points is 12.

14. 設全校有  $8y$  位老師。  
 $11(3y-2) = 5(5y+2)$   
 $33y - 22 = 25y + 10$   
 $8y = 32$   
 $y = 4$   
全校有 32 位老師。

14. Let  $8y$  be the number of teachers in the school.  
 $11(3y-2) = 5(5y+2)$   
 $33y - 22 = 25y + 10$   
 $8y = 32$   
 $y = 4$   
The number of teachers in the school is 32.

15. 如果全部是白棋子，共重 500 g。  
 換 1 隻黑棋子，共重 501 g。  
 換 2 隻黑棋子，共重 502 g。  
 ⋮  
 換 26 隻黑棋子，共重 526 g。  
 有黑棋子 26 和白棋子 24 隻。

15. If all the chesses are white, they weigh 500 g in total.  
 Exchange 1 white chess for 1 black chess.  
 They weigh 501 g in total.  
 Exchange 2 white chesses for 2 black chesses. They weigh 502 g in total.  
 ⋮  
 Exchange 26 white chesses for 26 black chesses. They weigh 526 g in total.  
 There are 26 black chesses and 24 white chesses.

16. 
$$\frac{1^2 + 2^2 + \dots + 40^2}{1 + 2 + \dots + 40} = \frac{2 \times 40 + 1}{3} = 27$$
  

$$\therefore 1^2 + 2^2 + 3^2 + \dots + 40^2 = 27 \times \frac{(1 + 40)}{2} \times 40$$
  

$$= 22\ 140$$

17. 陰影面積佔長方形的  $\frac{3}{8}$ 。  
 長方形面積是：  
 $13.5 \div \frac{3}{8} = 36 \text{ (cm}^2\text{)}$

17.  $\frac{3}{8}$  of the rectangle is shaded.  
 $13.5 \div \frac{3}{8} = 36$   
 The area of the rectangle is 36 cm<sup>2</sup>.

18. 書枱和椅子原價為  $560 \div 0.8 = 700$  元  
 書枱的 10% 是： $700 - 650 = 50$  (元)  
 $\therefore$  書枱的原價為 500 元，椅子原價為  
 $700 - 500 = 200$  元。

18.  $560 \div 0.8 = 700$   
 The original price of the desk and the chair is \$700.  
 $700 - 650 = 50$   
 10% of the price of the desk is \$50.  
 The original price of the desk is \$500 and the original price of the chair is  $700 - 500 =$   
 \$200.

19. 厚筆記簿有 30 張。  
 薄筆記簿有 25 張。  
 若所有都是薄簿，共用紙 325 張。  
 若 1 本是厚筆記簿，12 本是薄筆記簿，  
 共用紙 330 張。  
 若 2 本是厚筆記簿，11 本是薄筆記簿，  
 共用紙 335 張。  
 ∴  
 ∴  
 若 7 本是厚筆記簿，6 本是薄筆記簿，共  
 用紙 360 張。  
 ∴ 有厚筆記簿 7 本和薄筆記簿 6 本。

20. 火車用 (75 - 15) 秒行 1080 米。  
 速度 =  $\frac{1080}{60} = 18$  米/秒  
 ∴ 火車長度為 18 米/秒 × 15 秒 = 270 (米)

19. A thick notebook has 30 pages  
 A thin notebook has 25 pages  
 If all the notebooks are thin notebooks, there  
 are 325 pieces of paper in total.  
 If there are 1 thick notebook and 12 thin  
 notebooks, there are 330 pieces of paper in  
 total.  
 If there are 2 thick notebooks and 11 thin  
 notebooks, there are 335 pieces of paper in  
 total.  
 ∴  
 ∴  
 If there are 7 thick notebooks and 6 thin  
 notebooks, there are 360 pieces of paper in  
 total.  
 ∴ There are 7 thick notebooks and 6 thin  
 notebooks.

20. It takes the train (75 - 15) seconds to travel  
 1080 metres.  
 The speed =  $\frac{1080}{60} = 18$  m/s  
 The length of the train is  
 18m/s × 15s = 270 m