

- الحل :

سلسلة تمارين و حلول حول الجمع و الطرح

الأعداد الجذرية

حل التمرين الأول

يمكنك توحيد المقامات كما يمكنك إستعمال القاعدة التالية في جمع و طرح الأعداد الجذرية :

$$\frac{a}{b} \mp \frac{c}{d} = \frac{a \times d \mp b \times c}{b \times d}$$

$$\begin{aligned} a &= \frac{-15}{-4} + \left(\frac{-3}{-20} \right) = \frac{[-15 \times (-20)] + [(-3) \times (-4)]}{(-4) \times (-20)} = \frac{300 + 12}{80} = \frac{312}{80} \\ &= \frac{312 \div 8}{80 \div 8} = \frac{39}{10} \end{aligned}$$

$$b = \left(\frac{13}{-8} \right) + \left(\frac{-7}{13} \right) = \frac{[13 \times 13] + [(-8) \times (-7)]}{(-8) \times 13} = \frac{169 + 56}{104} = \frac{225}{104}$$

$$\begin{aligned} c &= \frac{14}{-8} - \left(\frac{10}{-19} \right) = \frac{[14 \times (-19)] - [(-8) \times 10]}{(-8) \times (-19)} = \frac{(-266) + 80}{152} = \frac{-186}{152} \\ &= -\frac{186 \div 2}{152 \div 2} = -\frac{93}{76} \end{aligned}$$

$$d = \frac{5}{11} + \left(\frac{-2}{7} \right) = \frac{[5 \times 7] + [(-2) \times 11]}{11 \times 7} = \frac{35 - 22}{77} = \frac{13}{77}$$

$$e = 1 - \left(\frac{-9}{8} \right) = \frac{[1 \times 8] - [(-9) \times 1]}{1 \times 8} = \frac{8 + 9}{8} = \frac{17}{8}$$

$$\begin{aligned} f &= \frac{-10}{11} + \left(\frac{16}{-14} \right) = \frac{[(-10) \times (-14)] + [11 \times 16]}{11 \times (-14)} = \frac{140 + 176}{-154} = -\frac{316}{154} \\ &= -\frac{316 \div 2}{154 \div 2} = -\frac{158}{77} \end{aligned}$$

الجواب

(1) نحسب D و E :

$$D = \frac{-1}{24} + \frac{2}{3} + \frac{3}{8} - \frac{7}{3} = \frac{-1}{24} + \frac{16}{24} + \frac{9}{24} - \frac{56}{24}$$

$$= \frac{-1 + 16 + 9 - 56}{24} = \frac{-32}{24} = \frac{-32 \div 8}{24 \div 8} = -\frac{4}{3}$$

$$E = \frac{1}{4} + \frac{15}{36} + \frac{1}{-4} - \frac{5}{12} = \frac{1}{4} + \frac{15 \div 3}{36 \div 3} + \frac{1}{-4} - \frac{5}{12}$$

$$= \frac{1}{4} + \frac{5}{12} + \frac{1}{-4} - \frac{5}{12} = 0$$

(2) نجد قيمة العدد x :

$$\spadesuit \quad \frac{-7}{8} + x = \frac{7}{24} \Rightarrow x = \frac{7}{24} - \frac{-7}{8} \Rightarrow x = \frac{56 + 168}{192}$$

$$\Rightarrow x = \frac{224}{192} \Rightarrow x = \frac{224 \div 32}{192 \div 32} = \Rightarrow x = \frac{7}{6}$$

$$\spadesuit \quad \frac{3}{5} + x = \frac{2}{7} \Rightarrow x = \frac{2}{7} - \frac{3}{5} \Rightarrow x = \frac{10 - 21}{35} \Rightarrow x = \frac{-11}{35}$$

(3) نكتب على شكل $m + (n/b)$

$$\clubsuit \quad \frac{7}{3} = \frac{6 + 1}{3} = \frac{6}{3} + \frac{1}{3} = 2 + \frac{1}{3}$$

$$\clubsuit \quad \frac{26}{6} = \frac{24 + 2}{6} = \frac{24}{6} + \frac{2}{6} = 4 + \frac{1}{3}$$

$$\clubsuit \quad \frac{12}{11} = \frac{11 + 1}{11} = \frac{11}{11} + \frac{1}{11} = 1 + \frac{1}{11}$$

الجواب

$$\clubsuit A = 1 + \left(-\frac{1}{2}\right) + \frac{1}{3} + \left(-\frac{1}{4}\right) = \frac{12}{12} + \left(-\frac{6}{12}\right) + \frac{4}{12} + \left(-\frac{3}{12}\right) \\ = \frac{12 - 6 + 4 - 3}{12} = \frac{7}{12}$$

$$\clubsuit B = -0.25 + \frac{1}{50} + \frac{-2}{5} = -\frac{25}{100} + \frac{1}{50} + \frac{-2}{5} = -\frac{25}{100} + \frac{2}{100} + \frac{-40}{100} \\ = \frac{-25 + 2 - 40}{100} = \frac{-63}{100}$$

$$\clubsuit C = \frac{3}{2} + \left(-\frac{2}{6}\right) + \frac{3}{15} = \frac{3}{2} + \left(-\frac{1}{3}\right) + \frac{1}{5} = \frac{45}{30} + \left(-\frac{10}{30}\right) + \frac{6}{30} \\ = \frac{45 - 10 + 6}{30} = \frac{41}{30}$$

$$\clubsuit D = \left(-\frac{2}{-7}\right) + \left(-\frac{4}{-3}\right) + \left(-\frac{1}{9}\right) = \frac{2}{7} + \frac{4}{3} + \left(-\frac{1}{9}\right) = \frac{18}{63} + \frac{84}{63} + \left(-\frac{7}{63}\right) \\ = \frac{18 + 84 - 7}{63} = \frac{95}{63}$$

حل التمرين الرابع

الجواب

1- نحسب و نبسط :

$$\clubsuit A = \frac{2a + b}{3} + \frac{5a + b}{6} = \frac{2(2a + b)}{6} + \frac{5a + b}{6} = \frac{4a + 2b + 5a + b}{6} \\ = \frac{9a + 3b}{6} = \frac{3(3a + b)}{6} = \frac{3a + b}{2}$$

$$\clubsuit B = \frac{a - b + 3}{6} - \frac{2a + b - 1}{4} = \frac{4(a - b + 3)}{24} - \frac{6(2a + b - 1)}{24} \\ = \frac{4a - 4b + 12}{24} - \frac{12a + 6b - 6}{24} = \frac{4a - 4b + 12 - 12a - 6b + 6}{24} \\ = \frac{-8a - 10b + 18}{24} = \frac{-4a - 5b + 9}{12}$$

$$\clubsuit C = \frac{7a - 3b}{15} - \frac{a + 3b}{10} = \frac{2(7a - 3b)}{30} - \frac{3(a + 3b)}{30} = \frac{14a - 6b - 3a - 9b}{30} \\ = \frac{11a - 15b}{30}$$

2- نحسب G :

$$G = 2 - \left[\left(1 - \frac{5}{3}\right) - \left(\frac{2}{5} + 1 - \frac{8}{3}\right) \right] - \left(\frac{1}{2} + \frac{18}{5}\right) \\ = 2 - \left(1 - \frac{5}{3}\right) + \left(\frac{2}{5} + 1 - \frac{8}{3}\right) - \left(\frac{1}{2} + \frac{18}{5}\right)$$

$$\begin{aligned}
 &= 2 - 1 + \frac{5}{3} + \frac{2}{5} + 1 - \frac{8}{3} - \frac{1}{2} - \frac{18}{5} \\
 &= 2 - \frac{1}{2} + \left(\frac{5}{3} - \frac{8}{3} \right) + \left(\frac{2}{5} - \frac{18}{5} \right) \\
 &= 2 - \frac{1}{2} + (-1) + \left(-\frac{16}{5} \right) \\
 &= 1 - \frac{1}{2} + \left(-\frac{16}{5} \right) \\
 &= \frac{2}{2} - \frac{1}{2} + \left(-\frac{16}{5} \right) \\
 &= \frac{1}{2} + \left(-\frac{16}{5} \right) \\
 &= \frac{5 - 32}{10}
 \end{aligned}$$

$$G = -\frac{27}{10}$$

3- نبين و نستنتج :

$$\hookrightarrow \frac{1}{n} - \frac{1}{n+1} = \frac{\cancel{n} + 1 - \cancel{n}}{n(n+1)} = \frac{1}{n(n+1)}$$

$$\hookrightarrow \frac{1}{1999} - \frac{1}{2000} = \frac{1}{1999 \times 2000} = \frac{1}{3998000}$$