

## 分数裂项

### 练习题

#### 一. 分数裂差初识（把下面分数写成裂差形式）

例如： $\frac{1}{6} = \frac{1}{2 \times 3} = \frac{1}{2} - \frac{1}{3}$

1.  $\frac{1}{20} =$

2.  $\frac{2}{15} =$

3.  $\frac{3}{10} =$

4.  $\frac{1}{12} + \frac{1}{20} + \frac{1}{30} + \frac{1}{42} =$

#### 二、分数裂差练习

1.  $\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} + \frac{1}{5 \times 6}$

$$2. \frac{1}{10 \times 11} + \frac{1}{11 \times 12} + \dots + \frac{1}{59 \times 60}$$

$$3. \frac{2}{10 \times 9} + \frac{2}{9 \times 8} + \frac{2}{8 \times 7} + \dots + \frac{2}{5 \times 4} + \frac{2}{4 \times 3} =$$

$$4. \frac{2}{1 \times 3} + \frac{2}{3 \times 5} + \frac{2}{5 \times 7}$$

### 三. 分数裂和

举例：

$$\frac{5}{6} = \frac{2+3}{2 \times 3} = \frac{1}{2} + \frac{1}{3}$$

1.  $\frac{8}{15}$

2.  $\frac{10}{21}$

### 四、分数裂和练习

1.  $\frac{3}{2} - \frac{5}{6} + \frac{7}{12} - \frac{9}{20}$

2.  $\frac{1}{3} + \frac{3}{4} + \frac{2}{5} + \frac{5}{7} + \frac{7}{8} + \frac{9}{20} + \frac{10}{21} + \frac{11}{24} + \frac{12}{35}$

## 分数裂项

### 练习题答案解析

#### 一、分数裂差初识

1、 $\frac{1}{4} - \frac{1}{5}$

2、 $\frac{1}{3} - \frac{1}{5}$

3、 $\frac{1}{2} - \frac{1}{5}$

4、  
$$= (\frac{1}{3} - \frac{1}{4}) + (\frac{1}{4} - \frac{1}{5}) + (\frac{1}{5} - \frac{1}{6}) + (\frac{1}{6} - \frac{1}{7})$$
$$= \frac{1}{3} - \frac{1}{7}$$
$$= \frac{4}{21}$$

#### 二、分数裂差练习

1、  
$$= (\frac{1}{1} - \frac{1}{2}) + (\frac{1}{2} - \frac{1}{3}) + \dots + (\frac{1}{5} - \frac{1}{6})$$
$$= \frac{1}{1} - \frac{1}{2} + \frac{1}{2} - \frac{1}{3} + \dots + \frac{1}{5} - \frac{1}{6}$$
$$= \frac{1}{1} - \frac{1}{6}$$
$$= \frac{5}{6}$$

2、

原式

$$\begin{aligned}
 &= \left(\frac{1}{10} - \frac{1}{11}\right) + \left(\frac{1}{11} - \frac{1}{12}\right) + \dots + \left(\frac{1}{59} - \frac{1}{60}\right) \\
 &= \frac{1}{10} - \frac{1}{11} + \frac{1}{11} - \frac{1}{12} + \dots + \frac{1}{59} - \frac{1}{60} \\
 &= \frac{1}{10} - \frac{1}{60} \\
 &= \frac{1}{12}
 \end{aligned}$$

3、

原式

$$\begin{aligned}
 &= 2 \times \left(\frac{1}{9} - \frac{1}{10} + \frac{1}{8} - \frac{1}{9} + \dots + \frac{1}{4} - \frac{1}{5} + \frac{1}{3} - \frac{1}{4}\right) \\
 &= 2 \times \left(\frac{1}{3} - \frac{1}{10}\right) \\
 &= \frac{7}{15}
 \end{aligned}$$

4、

$$\begin{aligned}
 &= \frac{3-1}{1 \times 3} + \frac{5-3}{3 \times 5} + \frac{7-5}{5 \times 7} \\
 &= \left(\frac{3}{1 \times 3} - \frac{1}{1 \times 3}\right) + \left(\frac{5}{3 \times 5} - \frac{3}{3 \times 5}\right) + \left(\frac{7}{5 \times 7} - \frac{5}{5 \times 7}\right) \\
 &= \left(\frac{1}{1} - \frac{1}{3}\right) + \left(\frac{1}{3} - \frac{1}{5}\right) + \left(\frac{1}{5} - \frac{1}{7}\right) \\
 &= \frac{1}{1} - \frac{1}{7} \\
 &= \frac{6}{7}
 \end{aligned}$$

### 三、分数裂和

1、 $\frac{1}{3} + \frac{1}{5}$

2、 $\frac{1}{3} + \frac{1}{7}$

## 分数裂和练习

1、

$$\begin{aligned}
 &= (1 + \frac{1}{2}) - (\frac{1}{2} + \frac{1}{3}) + (\frac{1}{3} + \frac{1}{4}) - (\frac{1}{4} + \frac{1}{5}) \\
 &= 1 + \frac{1}{2} - \frac{1}{2} - \frac{1}{3} + \frac{1}{3} + \frac{1}{4} - \frac{1}{4} - \frac{1}{5} \\
 &= 1 - \frac{1}{5} \\
 &= \frac{4}{5}
 \end{aligned}$$

2、

$$\begin{aligned}
 &= \frac{1}{3} + \frac{3}{4} + \frac{2}{5} + \frac{5}{7} + \frac{9}{20} + \frac{10}{21} + \frac{11}{24} + \frac{12}{35} \\
 &= \frac{1}{3} + \frac{3}{4} + \frac{2}{5} + \frac{5}{7} + (\frac{1}{4} + \frac{1}{5}) + (\frac{1}{3} + \frac{1}{7}) + (\frac{1}{3} + \frac{1}{8}) + (\frac{1}{5} + \frac{1}{7}) \\
 &= \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{3}{4} + \frac{1}{4} + \frac{2}{5} + \frac{1}{5} + \frac{1}{5} + \frac{5}{7} + \frac{1}{7} + \frac{1}{7} \\
 &= 1 + 1 + \frac{4}{5} + 1 \\
 &= 3\frac{4}{5}
 \end{aligned}$$