ステップ1　分母を積で表して通分

1 □にあてはまる数を書きなさい。

(1) $\dfrac{1}{1 \times 2} - \dfrac{1}{2 \times 3} = \dfrac{\square}{1 \times 2 \times 3} - \dfrac{\square}{1 \times 2 \times 3} = \dfrac{\square}{1 \times 2 \times 3}$

(2) $\dfrac{1}{2 \times 3} - \dfrac{1}{3 \times 4} = \dfrac{\square}{2 \times 3 \times 4} - \dfrac{\square}{2 \times 3 \times 4} = \dfrac{\square}{2 \times 3 \times 4}$

(3) $\dfrac{1}{3 \times 4} - \dfrac{1}{4 \times 5} = \dfrac{\square}{3 \times 4 \times 5} - \dfrac{\square}{3 \times 4 \times 5} = \dfrac{\square}{3 \times 4 \times 5}$

(4) $\dfrac{1}{4 \times 5} - \dfrac{1}{5 \times 6} = \dfrac{\square}{4 \times 5 \times 6} - \dfrac{\square}{4 \times 5 \times 6} = \dfrac{\square}{4 \times 5 \times 6}$

(5) $\dfrac{1}{5 \times 6} - \dfrac{1}{6 \times 7} = \dfrac{\square}{5 \times 6 \times 7} - \dfrac{\square}{5 \times 6 \times 7} = \dfrac{\square}{5 \times 6 \times 7}$

(6) $\dfrac{1}{6 \times 7} - \dfrac{1}{7 \times 8} = \dfrac{\square}{6 \times 7 \times 8} - \dfrac{\square}{6 \times 7 \times 8} = \dfrac{\square}{6 \times 7 \times 8}$

ステップ２　単位分数の差で表す①

2 ①の逆の操作をします。例にならって、□にあてはまる数を書きなさい。

【例】 $\dfrac{2}{1 \times 2 \times 3} = \dfrac{3}{1 \times 2 \times 3} - \dfrac{1}{1 \times 2 \times 3} = \dfrac{1}{1 \times 2} - \dfrac{1}{2 \times 3}$

(1) $\dfrac{2}{2 \times 3 \times 4} = \dfrac{\Box}{2 \times 3 \times 4} - \dfrac{\Box}{2 \times 3 \times 4} = \dfrac{\Box}{\Box \times \Box} - \dfrac{\Box}{\Box \times \Box}$

(2) $\dfrac{2}{3 \times 4 \times 5} = \dfrac{\Box}{3 \times 4 \times 5} - \dfrac{\Box}{3 \times 4 \times 5} = \dfrac{\Box}{\Box \times \Box} - \dfrac{\Box}{\Box \times \Box}$

(3) $\dfrac{2}{4 \times 5 \times 6} = \dfrac{\Box}{4 \times 5 \times 6} - \dfrac{\Box}{4 \times 5 \times 6} = \dfrac{\Box}{\Box \times \Box} - \dfrac{\Box}{\Box \times \Box}$

(4) $\dfrac{2}{5 \times 6 \times 7} = \dfrac{\Box}{\Box \times \Box} - \dfrac{\Box}{\Box \times \Box}$

(5) $\dfrac{2}{6 \times 7 \times 8} = \dfrac{\Box}{\Box \times \Box} - \dfrac{\Box}{\Box \times \Box}$

ステップ３　練習問題①

3 □にあてはまる数を書きなさい。

$$\frac{2}{2\times3\times4}+\frac{2}{3\times4\times5}+\frac{2}{4\times5\times6}$$

$$=\frac{\square}{\square\times\square}-\frac{\square}{\square\times\square}+\frac{\square}{\square\times\square}-\frac{\square}{\square\times\square}+\frac{\square}{\square\times\square}-\frac{\square}{\square\times\square}$$

$$=\frac{\square}{\square\times\square}-\frac{\square}{\square\times\square}$$

$$=\frac{\square}{\square}$$

> 同じ分数を引いて
> 足しているので、
> 相殺（そうさい）
> されます。

4 次の計算をしなさい。

(1) $\dfrac{2}{2\times3\times4}+\dfrac{2}{3\times4\times5}+\dfrac{2}{4\times5\times6}+\dfrac{2}{5\times6\times7}$

(2) $\dfrac{2}{3\times4\times5}+\dfrac{2}{4\times5\times6}+\dfrac{2}{5\times6\times7}+\dfrac{2}{6\times7\times8}+\dfrac{2}{7\times8\times9}$

(3) $\dfrac{2}{1\times2\times3}+\dfrac{2}{2\times3\times4}+\dfrac{2}{3\times4\times5}+\cdot\cdot\cdot+\dfrac{2}{9\times10\times11}$

ステップ4　単位分数の差で表す②

5 □にあてはまる数を書きなさい。

(1) $\dfrac{2}{1\times2\times3}=\dfrac{\square}{\square\times\square}-\dfrac{\square}{\square\times\square}$ より、

$\dfrac{1}{1\times2\times3}=(\dfrac{\square}{\square\times\square}-\dfrac{\square}{\square\times\square})\times\dfrac{\square}{\square}$

(2) $\dfrac{1}{2\times3\times4}=(\dfrac{\square}{\square\times\square}-\dfrac{\square}{\square\times\square})\times\dfrac{\square}{\square}$

(3) $\dfrac{1}{3\times4\times5}=(\dfrac{\square}{\square\times\square}-\dfrac{\square}{\square\times\square})\times\dfrac{\square}{\square}$

(4) $\dfrac{1}{4\times5\times6}=(\dfrac{\square}{\square\times\square}-\dfrac{\square}{\square\times\square})\times\dfrac{\square}{\square}$

(5) $\dfrac{1}{5\times6\times7}=(\dfrac{\square}{\square\times\square}-\dfrac{\square}{\square\times\square})\times\dfrac{\square}{\square}$

ステップ5　練習問題②

6 □にあてはまる数を書きなさい。

$$\frac{1}{2\times3\times4}+\frac{1}{3\times4\times5}+\frac{1}{4\times5\times6}$$

$$=\left(\frac{2}{2\times3\times4}+\frac{2}{3\times4\times5}+\frac{2}{4\times5\times6}\right)\times\frac{\Box}{\Box}$$

$$=\left(\frac{\Box}{\Box\times\Box}-\frac{\Box}{\Box\times\Box}+\frac{\Box}{\Box\times\Box}-\frac{\Box}{\Box\times\Box}+\frac{\Box}{\Box\times\Box}-\frac{\Box}{\Box\times\Box}\right)\times\frac{\Box}{\Box}$$

$$=\left(\frac{\Box}{\Box\times\Box}-\frac{\Box}{\Box\times\Box}\right)\times\frac{\Box}{\Box}$$

$$=\frac{\Box}{\Box}\times\frac{\Box}{\Box}$$

$$=\frac{\Box}{\Box}$$

同じ分数を引いて
足しているので、
相殺（そうさい）
されます。

6

7 次の計算をしなさい。

(1) $\dfrac{1}{2 \times 3 \times 4} + \dfrac{1}{3 \times 4 \times 5} + \dfrac{1}{4 \times 5 \times 6} + \dfrac{1}{5 \times 6 \times 7}$

(2) $\dfrac{1}{3 \times 4 \times 5} + \dfrac{1}{4 \times 5 \times 6} + \dfrac{1}{5 \times 6 \times 7} + \dfrac{1}{6 \times 7 \times 8} + \dfrac{1}{7 \times 8 \times 9}$

(3) $\dfrac{1}{1 \times 2 \times 3} + \dfrac{1}{2 \times 3 \times 4} + \dfrac{1}{3 \times 4 \times 5} + \cdots + \dfrac{1}{9 \times 10 \times 11}$

ステップ 8 応用問題

8 次の計算をしなさい。

(1) $\dfrac{4}{1\times3\times5}+\dfrac{4}{3\times5\times7}+\dfrac{4}{5\times7\times9}+\dfrac{4}{7\times9\times11}$

(2) $\dfrac{1}{1\times3\times5}+\dfrac{1}{3\times5\times7}+\dfrac{1}{5\times7\times9}+\dfrac{1}{7\times9\times11}$

■ 解 答 ■

1 (1) 3、1、2
(2) 4、2、2
(3) 5、3、2
(4) 6、4、2
(5) 7、5、2
(6) 8、6、2

2 (1) 4、2、$\dfrac{1}{2 \times 3}$、$\dfrac{1}{3 \times 4}$

(2) 5、3、$\dfrac{1}{3 \times 4}$、$\dfrac{1}{4 \times 5}$

(3) 6、4、$\dfrac{1}{4 \times 5}$、$\dfrac{1}{5 \times 6}$

(4) $\dfrac{1}{5 \times 6}$、$\dfrac{1}{6 \times 7}$

(5) $\dfrac{1}{6 \times 7}$、$\dfrac{1}{7 \times 8}$

3 $(与式) = \dfrac{1}{2 \times 3} - \dfrac{1}{3 \times 4} + \dfrac{1}{3 \times 4} - \dfrac{1}{4 \times 5}$

$\qquad + \dfrac{1}{4 \times 5} - \dfrac{1}{5 \times 6}$

$\qquad = \dfrac{1}{2 \times 3} - \dfrac{1}{5 \times 6}$

$\qquad = \dfrac{2}{15}$

4 (1) $\dfrac{1}{7}$ (2) $\dfrac{5}{72}$ (3) $\dfrac{27}{55}$

5 (1) $\dfrac{1}{1 \times 2}$、$\dfrac{1}{2 \times 3}$、

$\qquad \dfrac{1}{1 \times 2}$、$\dfrac{1}{2 \times 3}$、$\dfrac{1}{2}$

(2) $\dfrac{1}{2 \times 3}$、$\dfrac{1}{3 \times 4}$、$\dfrac{1}{2}$

(3) $\dfrac{1}{3 \times 4}$、$\dfrac{1}{4 \times 5}$、$\dfrac{1}{2}$

(4) $\dfrac{1}{4 \times 5}$、$\dfrac{1}{5 \times 6}$、$\dfrac{1}{2}$

(5) $\dfrac{1}{5 \times 6}$、$\dfrac{1}{6 \times 7}$、$\dfrac{1}{2}$

6 $(与式) = (\cdots 省略 \cdots) \times \dfrac{1}{2}$

$\qquad = (\dfrac{1}{2 \times 3} - \dfrac{1}{3 \times 4} + \dfrac{1}{3 \times 4} - \dfrac{1}{4 \times 5}$

$\qquad + \dfrac{1}{4 \times 5} - \dfrac{1}{5 \times 6}) \times \dfrac{1}{2}$

$\qquad = (\dfrac{1}{2 \times 3} - \dfrac{1}{5 \times 6}) \times \dfrac{1}{2}$

$\qquad = \dfrac{2}{15} \times \dfrac{1}{2}$

$\qquad = \dfrac{1}{15}$

7 (1) $\dfrac{1}{14}$ (2) $\dfrac{5}{144}$ (3) $\dfrac{27}{110}$

8 (1) $\dfrac{32}{99}$ (2) $\dfrac{8}{99}$

■ 解説 ■

4 (1) $(与式) = \dfrac{1}{2 \times 3} - \dfrac{1}{3 \times 4} + \dfrac{1}{3 \times 4} - \dfrac{1}{4 \times 5} + \dfrac{1}{4 \times 5} - \dfrac{1}{5 \times 6} + \dfrac{1}{5 \times 6} - \dfrac{1}{6 \times 7}$

$= \dfrac{1}{2 \times 3} - \dfrac{1}{6 \times 7}$

$= \dfrac{1}{7}$

(2) $(与式) = \dfrac{1}{3 \times 4} - \dfrac{1}{4 \times 5} + \dfrac{1}{4 \times 5} - \dfrac{1}{5 \times 6} + \dfrac{1}{5 \times 6} - \dfrac{1}{6 \times 7}$

$+ \dfrac{1}{6 \times 7} - \dfrac{1}{7 \times 8} + \dfrac{1}{7 \times 8} - \dfrac{1}{8 \times 9}$

$= \dfrac{1}{3 \times 4} - \dfrac{1}{8 \times 9}$

$= \dfrac{5}{72}$

(3) $(与式) = \dfrac{1}{1 \times 2} - \dfrac{1}{2 \times 3} + \dfrac{1}{2 \times 3} - \dfrac{1}{3 \times 4} + \dfrac{1}{3 \times 4} - \dfrac{1}{4 \times 5} + \cdots + \dfrac{1}{9 \times 10} - \dfrac{1}{10 \times 11}$

$= \dfrac{1}{1 \times 2} - \dfrac{1}{10 \times 11}$

$= \dfrac{27}{55}$

7 (1) $(与式) = \left(\dfrac{2}{2 \times 3 \times 4} + \dfrac{2}{3 \times 4 \times 5} + \dfrac{2}{4 \times 5 \times 6} + \dfrac{2}{5 \times 6 \times 7} \right) \times \dfrac{1}{2}$

$= \left(\dfrac{1}{2 \times 3} - \dfrac{1}{3 \times 4} + \dfrac{1}{3 \times 4} - \dfrac{1}{4 \times 5} + \dfrac{1}{4 \times 5} - \dfrac{1}{5 \times 6} + \dfrac{1}{5 \times 6} - \dfrac{1}{6 \times 7} \right) \times \dfrac{1}{2}$

$= \left(\dfrac{1}{2 \times 3} - \dfrac{1}{6 \times 7} \right) \times \dfrac{1}{2}$

$= \dfrac{1}{7} \times \dfrac{1}{2}$

$= \dfrac{1}{14}$

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(2) $(与式)=(\dfrac{2}{3\times4\times5}+\dfrac{2}{4\times5\times6}+\dfrac{2}{5\times6\times7}+\dfrac{2}{6\times7\times8}+\dfrac{2}{7\times8\times9})\times\dfrac{1}{2}$

$=(\dfrac{1}{3\times4}-\dfrac{1}{4\times5}+\dfrac{1}{4\times5}-\dfrac{1}{5\times6}+\dfrac{1}{5\times6}-\dfrac{1}{6\times7}$

$+\dfrac{1}{6\times7}-\dfrac{1}{7\times8}+\dfrac{1}{7\times8}-\dfrac{1}{8\times9})\times\dfrac{1}{2}$

$=(\dfrac{1}{3\times4}-\dfrac{1}{8\times9})\times\dfrac{1}{2}$

$=\dfrac{5}{72}\times\dfrac{1}{2}$

$=\underline{\dfrac{5}{144}}$

(3) $(与式)=(\dfrac{2}{1\times2\times3}+\dfrac{2}{2\times3\times4}+\dfrac{2}{3\times4\times5}+\cdots+\dfrac{2}{9\times10\times11})\times\dfrac{1}{2}$

$=(\dfrac{1}{1\times2}-\dfrac{1}{2\times3}+\dfrac{1}{2\times3}-\dfrac{1}{3\times4}+\dfrac{1}{3\times4}-\dfrac{1}{4\times5}+$

$\cdots+\dfrac{1}{9\times10}-\dfrac{1}{10\times11})\times\dfrac{1}{2}$

$=(\dfrac{1}{1\times2}-\dfrac{1}{10\times11})\times\dfrac{1}{2}$

$=\dfrac{27}{55}\times\dfrac{1}{2}$

$=\underline{\dfrac{27}{110}}$

8 (1) $(与式)=\dfrac{1}{1\times3}-\dfrac{1}{3\times5}+\dfrac{1}{3\times5}-\dfrac{1}{5\times7}+\dfrac{1}{5\times7}-\dfrac{1}{7\times9}+\dfrac{1}{7\times9}-\dfrac{1}{9\times11}$

$=\dfrac{1}{1\times3}-\dfrac{1}{9\times11}$

$=\underline{\dfrac{32}{99}}$

(2) (1)の$\dfrac{1}{4}$倍。 $\dfrac{32}{99}\times\dfrac{1}{4}=\underline{\dfrac{8}{99}}$

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