

反射テスト 平方根 分母の有理化 多項式の分母 01

1. 分母を有理化せよ。(S級 35秒, A級 50秒, B級 1分30秒, C級 2分40秒)

(1) $\frac{1}{\sqrt{2}+1}$

(2) $\frac{1}{\sqrt{7}-\sqrt{2}}$

(3) $\frac{4}{2\sqrt{2}+\sqrt{6}}$

(4) $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

2. 分母を有理化せよ. (S 級 40 秒, A 級 1 分, B 級 1 分 40 秒, C 級 3 分)

(1) $\frac{1}{2 - \sqrt{3}}$

(2) $\frac{1}{\sqrt{7} + \sqrt{5}}$

(3) $\frac{6}{2\sqrt{3} - \sqrt{10}}$

(4) $\frac{\sqrt{7} - \sqrt{3}}{\sqrt{7} + \sqrt{3}}$

反射テスト 平方根 分母の有理化 多項式の分母 01 解答解説

1. 分母を有理化せよ。(S級 35秒, A級 50秒, B級 1分30秒, C級 2分40秒)

★分母の有理化(分母が多項式)

$$\frac{k}{\sqrt{a} + \sqrt{b}} = \frac{k \times (\sqrt{a} - \sqrt{b})}{(\sqrt{a} + \sqrt{b}) \times (\sqrt{a} - \sqrt{b})} = \frac{k(\sqrt{a} - \sqrt{b})}{a - b}$$

☆分母の真ん中の符号を換えた式を分母分子に掛ける.

$$(1) \quad \frac{1}{\sqrt{2} + 1}$$

$$= \frac{1 \times (\sqrt{2} - 1)}{(\sqrt{2} + 1) \times (\sqrt{2} - 1)}$$

$$= \frac{\sqrt{2} - 1}{\sqrt{2}^2 - 1^2}$$

$$= \frac{\sqrt{2} - 1}{2 - 1}$$

$$= \frac{\sqrt{2} - 1}{1}$$

$$= \sqrt{2} - 1$$

$$(2) \quad \frac{1}{\sqrt{7} - \sqrt{2}}$$

$$= \frac{1 \times (\sqrt{7} + \sqrt{2})}{(\sqrt{7} - \sqrt{2}) \times (\sqrt{7} + \sqrt{2})}$$

$$= \frac{\sqrt{7} + \sqrt{2}}{\sqrt{7}^2 - \sqrt{2}^2}$$

$$= \frac{\sqrt{7} + \sqrt{2}}{7 - 2}$$

$$= \frac{\sqrt{7} + \sqrt{2}}{5}$$

$$(3) \quad \frac{4}{2\sqrt{2} + \sqrt{6}}$$

$$= \frac{4 \times (2\sqrt{2} - \sqrt{6})}{(2\sqrt{2} + \sqrt{6}) \times (2\sqrt{2} - \sqrt{6})}$$

$$= \frac{4(2\sqrt{2} - \sqrt{6})}{(2\sqrt{2})^2 - \sqrt{6}^2}$$

$$= \frac{4(2\sqrt{2} - \sqrt{6})}{8 - 6}$$

$$= \frac{4(2\sqrt{2} - \sqrt{6})}{2}$$

$$= 2(2\sqrt{2} - \sqrt{6})$$

$$= 4\sqrt{2} - 2\sqrt{6}$$

$$(4) \quad \frac{\sqrt{5} + \sqrt{3}}{\sqrt{5} - \sqrt{3}}$$

$$= \frac{(\sqrt{5} + \sqrt{3}) \times (\sqrt{5} + \sqrt{3})}{(\sqrt{5} - \sqrt{3}) \times (\sqrt{5} + \sqrt{3})}$$

$$= \frac{(\sqrt{5} + \sqrt{3})^2}{(\sqrt{5})^2 - \sqrt{3}^2}$$

$$= \frac{\sqrt{5}^2 + 2 \cdot \sqrt{5} \cdot \sqrt{3} + \sqrt{3}^2}{5 - 3}$$

$$= \frac{5 + 2\sqrt{15} + 3}{2}$$

$$= \frac{8 + 2\sqrt{15}}{2}$$

$$= 4 + \sqrt{15}$$

2. 分母を有理化せよ。(S級40秒, A級1分, B級1分40秒, C級3分)

$$(1) \frac{1}{2-\sqrt{3}}$$

$$= \frac{1 \times (\sqrt{2} + \sqrt{3})}{(2-\sqrt{3}) \times (2+\sqrt{3})}$$

$$= \frac{2 + \sqrt{3}}{2^2 - \sqrt{3}^2}$$

$$= \frac{2 + \sqrt{3}}{4 - 3}$$

$$= 2 + \sqrt{3}$$

$$(2) \frac{1}{\sqrt{7} + \sqrt{5}}$$

$$= \frac{1 \times (\sqrt{7} - \sqrt{5})}{(\sqrt{7} + \sqrt{5}) \times (\sqrt{7} - \sqrt{5})}$$

$$= \frac{\sqrt{7} - \sqrt{5}}{\sqrt{7}^2 - \sqrt{5}^2}$$

$$= \frac{\sqrt{7} - \sqrt{5}}{7 - 5}$$

$$= \frac{\sqrt{7} - \sqrt{5}}{2}$$

$$(3) \frac{6}{2\sqrt{3} - \sqrt{10}}$$

$$= \frac{6 \times (2\sqrt{3} + \sqrt{10})}{(2\sqrt{3} - \sqrt{10}) \times (2\sqrt{3} + \sqrt{10})}$$

$$= \frac{6(2\sqrt{3} + \sqrt{10})}{(2\sqrt{3})^2 - \sqrt{10}^2}$$

$$= \frac{6(2\sqrt{3} + \sqrt{10})}{12 - 10}$$

$$= \frac{6(2\sqrt{3} + \sqrt{10})}{2}$$

$$= 3(2\sqrt{3} + \sqrt{10})$$

$$= 6\sqrt{3} + 3\sqrt{10}$$

$$(4) \frac{\sqrt{7} - \sqrt{3}}{\sqrt{7} + \sqrt{3}}$$

$$= \frac{(\sqrt{7} - \sqrt{3}) \times (\sqrt{7} - \sqrt{3})}{(\sqrt{7} + \sqrt{3}) \times (\sqrt{7} - \sqrt{3})}$$

$$= \frac{(\sqrt{7} - \sqrt{3})^2}{(\sqrt{7})^2 - \sqrt{3}^2}$$

$$= \frac{\sqrt{7}^2 - 2 \cdot \sqrt{7} \cdot \sqrt{3} + \sqrt{3}^2}{7 - 3}$$

$$= \frac{7 - 2\sqrt{21} + 3}{4}$$

$$= \frac{10 - 2\sqrt{21}}{4}$$

$$= \frac{5 - \sqrt{21}}{2}$$