

練習 3 9 次の式を計算せよ。

- (1)  $(4\sqrt{2} + 3\sqrt{5})(2\sqrt{2} - \sqrt{5})$       (2)  $(2\sqrt{3} - \sqrt{6})(\sqrt{3} + 3\sqrt{6})$   
 (3)  $(\sqrt{7} + \sqrt{3})^2$       (4)  $(\sqrt{6} - 2)^2$   
 (5)  $(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2})$       (6)  $(3 - \sqrt{5})(3 + \sqrt{5})$

解説

- (1)  $(4\sqrt{2} + 3\sqrt{5})(2\sqrt{2} - \sqrt{5}) = 4\sqrt{2} \times 2\sqrt{2} - 4\sqrt{2}\sqrt{5} + 3\sqrt{5} \times 2\sqrt{2} - 3\sqrt{5}\sqrt{5}$   
 $= 8 \times 2 - 4\sqrt{10} + 6\sqrt{10} - 3 \times 5$   
 $= 1 + 2\sqrt{10}$   
 (2)  $(2\sqrt{3} - \sqrt{6})(\sqrt{3} + 3\sqrt{6}) = 2\sqrt{3}\sqrt{3} + 2\sqrt{3} \times 3\sqrt{6} - \sqrt{6}\sqrt{3} - \sqrt{6} \times 3\sqrt{6}$   
 $= 2 \times 3 + 6 \times 3\sqrt{2} - 3\sqrt{2} - 3 \times 6$   
 $= -12 + 15\sqrt{2}$   
 (3)  $(\sqrt{7} + \sqrt{3})^2 = (\sqrt{7})^2 + 2\sqrt{7}\sqrt{3} + (\sqrt{3})^2$   
 $= 7 + 2\sqrt{21} + 3$   
 $= 10 + 2\sqrt{21}$   
 (4)  $(\sqrt{6} - 2)^2 = (\sqrt{6})^2 - 2\sqrt{6} \times 2 + 2^2$   
 $= 6 - 4\sqrt{6} + 4$   
 $= 10 - 4\sqrt{6}$   
 (5)  $(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2}) = (\sqrt{3})^2 - (\sqrt{2})^2 = 3 - 2 = 1$   
 (6)  $(3 - \sqrt{5})(3 + \sqrt{5}) = 3^2 - (\sqrt{5})^2 = 9 - 5 = 4$

練習 4 0 次の式の分母を有理化せよ。

- (1)  $\frac{2}{\sqrt{3}}$       (2)  $\frac{4}{\sqrt{2}}$       (3)  $\frac{\sqrt{3}}{\sqrt{2}}$       (4)  $\frac{1}{2\sqrt{5}}$

解説

- (1)  $\frac{2}{\sqrt{3}} = \frac{2 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{2\sqrt{3}}{3}$   
 (2)  $\frac{4}{\sqrt{2}} = \frac{4 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{4\sqrt{2}}{2} = 2\sqrt{2}$   
 (3)  $\frac{\sqrt{3}}{\sqrt{2}} = \frac{\sqrt{3} \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{\sqrt{6}}{2}$   
 (4)  $\frac{1}{2\sqrt{5}} = \frac{1 \times \sqrt{5}}{2\sqrt{5} \times \sqrt{5}} = \frac{\sqrt{5}}{10}$

練習 4 1 次の式の分母を有理化せよ。

- (1)  $\frac{1}{\sqrt{3} + \sqrt{2}}$       (2)  $\frac{\sqrt{2}}{\sqrt{5} - \sqrt{3}}$       (3)  $\frac{2\sqrt{3}}{\sqrt{5} + 1}$       (4)  $\frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}}$

解説

- (1)  $\frac{1}{\sqrt{3} + \sqrt{2}} = \frac{\sqrt{3} - \sqrt{2}}{(\sqrt{3} + \sqrt{2})(\sqrt{3} - \sqrt{2})} = \frac{\sqrt{3} - \sqrt{2}}{(\sqrt{3})^2 - (\sqrt{2})^2}$   
 $= \frac{\sqrt{3} - \sqrt{2}}{3 - 2}$   
 (2)  $\frac{\sqrt{2}}{\sqrt{5} - \sqrt{3}} = \frac{\sqrt{2}(\sqrt{5} + \sqrt{3})}{(\sqrt{5} - \sqrt{3})(\sqrt{5} + \sqrt{3})} = \frac{\sqrt{10} + \sqrt{6}}{(\sqrt{5})^2 - (\sqrt{3})^2}$   
 $= \frac{\sqrt{10} + \sqrt{6}}{2}$   
 (3)  $\frac{2\sqrt{3}}{\sqrt{5} + 1} = \frac{2\sqrt{3}(\sqrt{5} - 1)}{(\sqrt{5} + 1)(\sqrt{5} - 1)} = \frac{2\sqrt{15} - 2\sqrt{3}}{(\sqrt{5})^2 - 1^2} = \frac{2\sqrt{15} - 2\sqrt{3}}{4}$   
 $= \frac{2(\sqrt{15} - \sqrt{3})}{4} = \frac{\sqrt{15} - \sqrt{3}}{2}$   
 (4)  $\frac{\sqrt{5} + \sqrt{2}}{\sqrt{5} - \sqrt{2}} = \frac{(\sqrt{5} + \sqrt{2})^2}{(\sqrt{5} - \sqrt{2})(\sqrt{5} + \sqrt{2})} = \frac{(\sqrt{5})^2 + 2\sqrt{5}\sqrt{2} + (\sqrt{2})^2}{(\sqrt{5})^2 - (\sqrt{2})^2}$   
 $= \frac{5 + 2\sqrt{10} + 2}{5 - 2} = \frac{7 + 2\sqrt{10}}{3}$