1　平方根/平方根の簡約

次の数を簡単にしなさい.

(1) $\sqrt{16}$

(2) $\sqrt{81}$

(3) $\sqrt{25}$

(4) $\sqrt{9}$

(5) $\sqrt{36}$

(6) $\sqrt{4}$

(7) $\sqrt{100}$

(8) $\sqrt{1}$

(9) $\sqrt{49}$

(10) $\sqrt{64}$

(11) $\sqrt{121}$

(12) $\sqrt{0.04}$

(13) $\sqrt{\dfrac{16}{9}}$

(14) $\sqrt{0.0025}$

(15) $\sqrt{\dfrac{1}{4}}$

(16) $\sqrt{150}$

(17) $\sqrt{32}$

(18) $\sqrt{12}$

(19) $\sqrt{108}$

(20) $\sqrt{54}$

(21) $\sqrt{8}$

(22) $\sqrt{27}$

(23) $\sqrt{24}$

(24) $\sqrt{63}$

(25) $\sqrt{48}$

(26) $\sqrt{80}$

(27) $\sqrt{48}$

(28) $\sqrt{75}$

(29) $\sqrt{18}$

(30) $\sqrt{45}$

(31) $\sqrt{27}$

(32) $\sqrt{630}$

(33) $\sqrt{972}$

(34) $2\sqrt{63}$

(35) $2\sqrt{32}$

(36) $2\sqrt{96}$

(37) $4\sqrt{45}$

(38) $5\sqrt{8}$

(39) $5\sqrt{32}$

(40) $3\sqrt{24}$

(41) $2\sqrt{112}$

(42) $4\sqrt{80}$

(43) $2\sqrt{50}$

(44) $3\sqrt{18}$

(45) $3\sqrt{54}$

(46) $3\sqrt{20}$

(47) $3\sqrt{96}$

(48) $2\sqrt{72}$

(49) $3\sqrt{27}$

(50) $3\sqrt{150}$

2　平方根/有理化（基本）

次の数を有理化しなさい.

(1) $\dfrac{1}{2\sqrt{3}}$

(2) $\dfrac{3}{\sqrt{6}}$

(3) $\dfrac{1}{\sqrt{5}}$

(4) $\dfrac{2}{\sqrt{10}}$

(5) $\dfrac{1}{3\sqrt{3}}$

(6) $\dfrac{1}{\sqrt{10}}$

(7) $\dfrac{1}{3\sqrt{2}}$

(8) $\dfrac{1}{2\sqrt{5}}$

(9) $\dfrac{1}{\sqrt{3}}$

(10) $\dfrac{3}{2\sqrt{5}}$

(11) $\dfrac{1}{\sqrt{2}}$

(12) $\dfrac{2}{3\sqrt{3}}$

(13) $\dfrac{2}{\sqrt{6}}$

(14) $\dfrac{2\sqrt{2}-\sqrt{5}}{\sqrt{6}}$

(15) $\dfrac{\sqrt{3}+3}{\sqrt{2}}$

(16) $\dfrac{\sqrt{2}-\sqrt{6}}{\sqrt{3}}$

(17) $\dfrac{\sqrt{2}-\sqrt{6}}{\sqrt{5}}$

(18) $\dfrac{\sqrt{3}+2}{\sqrt{3}}$

(19) $\dfrac{\sqrt{6}+\sqrt{7}}{\sqrt{2}}$

(20) $\dfrac{\sqrt{7}-\sqrt{2}}{\sqrt{2}}$

(21) $\dfrac{1+\sqrt{2}}{\sqrt{3}}$

(22) $\dfrac{1-\sqrt{2}}{\sqrt{2}}$

(23) $\dfrac{\sqrt{3}-1}{\sqrt{2}}$

(24) $\dfrac{\sqrt{6}-2}{\sqrt{7}}$

(25) $\dfrac{\sqrt{3}-\sqrt{5}}{\sqrt{3}}$

3　平方根/乗除

次の式を計算しなさい.

(1) $\sqrt{5}\times\sqrt{3}$

(2) $\sqrt{5}\times\sqrt{2}$

(3) $\sqrt{8} \times \sqrt{3}$

(4) $\sqrt{7} \times \sqrt{3}$

(5) $\sqrt{8} \times \sqrt{2}$

(6) $\sqrt{2} \times \sqrt{3}$

(7) $\sqrt{3} \times \sqrt{5}$

(8) $\sqrt{6} \times \sqrt{2}$

(9) $\sqrt{5} \times \sqrt{8}$

(10) $\sqrt{5} \times \sqrt{7}$

(11) $\sqrt{2} \times \sqrt{6}$

(12) $\sqrt{3} \times \sqrt{8}$

(13) $\sqrt{6} \times \sqrt{5}$

(14) $\sqrt{21} \div \sqrt{3}$

(15) $\sqrt{21} \div \sqrt{7}$

(16) $\sqrt{30} \div \sqrt{5}$

(17) $\sqrt{15} \div \sqrt{3}$

(18) $\sqrt{15} \div \sqrt{5}$

(19) $\sqrt{48} \div \sqrt{8}$

(20) $\sqrt{35} \div \sqrt{5}$

(21) $\sqrt{24} \div \sqrt{8}$

(22) $\sqrt{10} \div \sqrt{2}$

(23) $\sqrt{14} \div \sqrt{7}$

(24) $\sqrt{16} \div \sqrt{2}$

(25) $\sqrt{48} \div \sqrt{6}$

(26) $\sqrt{56} \div \sqrt{8}$

(27) $-2\sqrt{5} \times \left(-3\sqrt{7}\right)$

(28) $-3\sqrt{10} \times \left(-3\sqrt{2}\right)$

(29) $-2\sqrt{10} \times \sqrt{7}$

(30) $\sqrt{8} \times \sqrt{5}$

(31) $-\sqrt{10} \times \sqrt{2}$

(32) $\sqrt{5} \times \sqrt{7}$

(33) $-3\sqrt{10} \div \sqrt{5}$

(34) $2\sqrt{16} \times \sqrt{6}$

(35) $\sqrt{15} \div \left(-3\sqrt{3}\right)$

(36) $-\sqrt{21} \div \left(-3\sqrt{3}\right)$

(37) $\sqrt{2} \div \left(-\sqrt{5}\right) \div \left(-\sqrt{2}\right)$

(38) $-\sqrt{5} \div \left(-\sqrt{5}\right) \times \sqrt{3}$

(39) $-2\sqrt{6} \times \left(-3\sqrt{5}\right) \div \sqrt{2}$

(40) $\sqrt{2} \times \left(-2\sqrt{2}\right) \times \left(-\sqrt{3}\right)$

(41) $\sqrt{3} \times \sqrt{2} \div \sqrt{3}$

(42) $2\sqrt{5} \times 2\sqrt{6} \times \sqrt{2}$

(43) $-\sqrt{3} \div 2\sqrt{3} \times \left(-\sqrt{3}\right)$

(44) $\sqrt{2} \times 2\sqrt{5} \times \sqrt{2}$

(45) $\sqrt{8} \div \sqrt{3} \div \left(-\sqrt{2}\right)$

(46) $2\sqrt{6} \times \left(-3\sqrt{3}\right) \div \sqrt{2}$

(47) $-3\sqrt{5} \div \sqrt{2} \div \left(-\sqrt{3}\right)$

(48) $2\sqrt{5} \div \left(-3\sqrt{3}\right) \times \left(-\sqrt{3}\right)$

(49) $2\sqrt{5} \div \sqrt{3} \div \sqrt{2}$

(50) $2\sqrt{3} \times 2\sqrt{5} \div \left(-\sqrt{3}\right)$

4　平方根/四則

次の数を有理化しなさい.

(1) $6\sqrt{3}+8\sqrt{3}$

(2) $3\sqrt{3}+7\sqrt{3}$

(3) $5\sqrt{2}+2\sqrt{2}$

(4) $\sqrt{3}-8\sqrt{3}$

(5) $7\sqrt{3}-\sqrt{3}$

(6) $\sqrt{2}-8\sqrt{2}$

(7) $\sqrt{20}-3\sqrt{5}$

(8) $\sqrt{48}-2\sqrt{3}$

(9) $\sqrt{12}-\sqrt{3}$

(10) $\sqrt{27}-6\sqrt{3}$

(11) $\sqrt{45}+\sqrt{20}$

(12) $\sqrt{5}+\sqrt{80}$

(13) $\sqrt{27}+\sqrt{48}$

(14) $\sqrt{8}-\sqrt{18}$

(15) $\sqrt{8}+\sqrt{18}$

(16) $\sqrt{2}-\sqrt{32}+2\sqrt{18}$

(17) $2\sqrt{2}+\sqrt{18}-\sqrt{8}$

(18) $\sqrt{3}-\sqrt{48}-2\sqrt{12}$

(19) $\sqrt{5}+\sqrt{45}-\sqrt{80}$

(20) $\sqrt{2}+\sqrt{32}+\sqrt{18}$

(21) $\sqrt{2}-\dfrac{1}{\sqrt{8}}$

(22) $\sqrt{12}+\dfrac{1}{\sqrt{3}}$

(23) $\sqrt{5}-\dfrac{2}{\sqrt{45}}$

(24) $\dfrac{2}{\sqrt{27}}+\sqrt{12}$

(25) $\dfrac{2}{\sqrt{27}}-\sqrt{3}$

(26) $\dfrac{2}{\sqrt{32}}-\sqrt{18}+\sqrt{8}$

(27) $\dfrac{1}{\sqrt{2}}+\sqrt{8}-\sqrt{18}$

(28) $\sqrt{18}-\sqrt{32}-\dfrac{1}{\sqrt{8}}$

(29) $\sqrt{27}+\dfrac{2}{\sqrt{3}}-\sqrt{12}$

(30) $\dfrac{1}{\sqrt{32}}-\sqrt{8}-\sqrt{2}$

5　平方根/展開

次の数を計算しなさい.

(1) $\sqrt{3}\left(1-\sqrt{27}\right)$

(2) $3\sqrt{2}\left(\sqrt{2}+1\right)$

(3) $\sqrt{2}\left(\sqrt{5}+\sqrt{3}\right)$

(4) $\left(\sqrt{20}+\sqrt{2}\right)\left(\sqrt{20}-\sqrt{2}\right)$

(5) $\left(\sqrt{5}-3\sqrt{2}\right)\left(\sqrt{5}+3\sqrt{2}\right)$

(6) $\left(2\sqrt{2}+1\right)\left(2\sqrt{2}-1\right)$

(7) $\left(\sqrt{2}-2\sqrt{3}\right)^2$

(8) $\left(2\sqrt{5}+\sqrt{18}\right)^2$

(9) $\left(\sqrt{2}-1\right)^2$

(10) $\left(1+\sqrt{2}\right)^2$

(11) $\left(\sqrt{2}-2\right)\left(\sqrt{2}+2\right)$

(12) $\left(1+\sqrt{5}\right)^2$

(13) $\left(\sqrt{2}+1\right)^2$

(14) $\left(\sqrt{20}+1\right)^2$

(15) $\left(\sqrt{5}+2\right)^2$

(16) $\left(\sqrt{18}-\sqrt{3}\right)\left(\sqrt{2}-\sqrt{3}\right)$

(17) $\left(1-\sqrt{12}\right)\left(3+\sqrt{3}\right)$

(18) $\left(\sqrt{3}-\sqrt{2}\right)\left(\sqrt{3}+\sqrt{2}\right)$

(19) $\left(\sqrt{3}-\sqrt{18}\right)\left(\sqrt{27}-\sqrt{8}\right)$

(20) $\left(\sqrt{3}-\sqrt{2}\right)\left(3\sqrt{3}+\sqrt{2}\right)$

6　平方根/有理化（応用）

次の数を計算しなさい.

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

(2) $\dfrac{2}{\sqrt{5}-\sqrt{3}}$

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

(4) $\dfrac{2\sqrt{2}-\sqrt{7}}{2\sqrt{2}+\sqrt{7}}$

(5) $\dfrac{\sqrt{7}-\sqrt{2}}{\sqrt{7}+\sqrt{2}}$

(6) $\dfrac{2\sqrt{2}+1}{2\sqrt{2}-1}$

(7) $\dfrac{\sqrt{6}+3}{\sqrt{5}-\sqrt{2}}$

(8) $\dfrac{2\sqrt{2}+\sqrt{3}}{\sqrt{6}+\sqrt{5}}$

(9) $\dfrac{\sqrt{5}-\sqrt{3}}{\sqrt{6}-\sqrt{3}}$

(10) $\dfrac{\sqrt{7}+2}{2\sqrt{2}+\sqrt{3}}$