

Aufgabe A1

Vereinfache ohne gerundete Zahlen.



- | | | | |
|----|-------------------|---|-------|
| a) | $(\sqrt{2})^4$ | = | <hr/> |
| b) | $(\sqrt{5})^7$ | = | <hr/> |
| c) | $(\sqrt{2})^3$ | = | <hr/> |
| d) | $(\sqrt{10})^5$ | = | <hr/> |
| e) | $(\sqrt{7})^4$ | = | <hr/> |
| f) | $(\sqrt{3})^{10}$ | = | <hr/> |
| g) | $(\sqrt{5})^5$ | = | <hr/> |
| h) | $(\sqrt{6})^8$ | = | <hr/> |
| i) | $(\sqrt{2})^9$ | = | <hr/> |

Aufgabe A2

Vereinfache ohne Verwendung eines Taschenrechners.

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|----|--|---|-------|
| a) | $(\sqrt{3})^3$ | = | <hr/> |
| b) | $(\sqrt{5})^8$ | = | <hr/> |
| c) | $(\sqrt{2})^{13}$ | = | <hr/> |
| d) | $(\sqrt{a})^6$ | = | <hr/> |
| e) | $(\sqrt{a^2 b})^4; a \in \mathbb{R}, b \geq 0$ | = | <hr/> |
| f) | $(\sqrt{a^2 b})^3; a \in \mathbb{R}, b \geq 0$ | = | <hr/> |
| g) | $(\sqrt{x^3})^5; x \geq 0$ | = | <hr/> |
| h) | $(\sqrt{2x})^3; x \geq 0$ | = | <hr/> |
| i) | $(\sqrt{2x})^6; x \geq 0$ | = | <hr/> |

Aufgabe A3

Berechne und vereinfache.

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|----|--|---|-------|
| a) | $(\sqrt{3x^3 y^5})^5; x \geq 0; y \geq 0$ | = | <hr/> |
| b) | $(\sqrt{5ab^2})^8; b \in \mathbb{R}, a \geq 0$ | = | <hr/> |
| c) | $(\sqrt{5ab^2})^7; b \in \mathbb{R}, a \geq 0$ | = | <hr/> |
| d) | $(\sqrt{a+b})^3; a+b \geq 0$ | = | <hr/> |
| e) | $(\sqrt{a-b})^4; a-b \geq 0$ | = | <hr/> |
| f) | $(\sqrt{2})^4$ | = | <hr/> |
| g) | $(\sqrt[3]{2})^6$ | = | <hr/> |

Aufgabe A4

Berechne und vereinfache.

- | | |
|------------------------|---------|
| a) $(\sqrt[4]{4})^2$ | = _____ |
| b) $(\sqrt[5]{7})^5$ | = _____ |
| c) $(\sqrt[6]{9})^6$ | = _____ |
| d) $(\sqrt[5]{a})^4$ | = _____ |
| e) $(\sqrt[4]{b})^4$ | = _____ |
| f) $(\sqrt[3]{x})^5$ | = _____ |
| g) $(\sqrt[3]{y^2})^3$ | = _____ |
| h) $(\sqrt[5]{z^2})^3$ | = _____ |

Lösung A1

- a) $(\sqrt{2})^4 = \sqrt{2^4} = 2 \cdot 2 = 4$
- b) $(\sqrt{5})^7 = \sqrt{5^7} = \sqrt{5^6 \cdot 5} = 5^3 \cdot \sqrt{5} = 125\sqrt{5}$
- c) $(\sqrt{2})^3 = \sqrt{2^3} = \sqrt{2^2 \cdot 2} = 2\sqrt{2}$
- d) $(\sqrt{10})^5 = \sqrt{10^5} = \sqrt{10^4 \cdot 10} = 10^2 \cdot \sqrt{10} = 100\sqrt{10}$
- e) $(\sqrt{7})^4 = \sqrt{7^4} = 7^2 = 49$
- f) $(\sqrt{3})^{10} = \sqrt{3^{10}} = 3^5 = 243$
- g) $(\sqrt{5})^5 = \sqrt{5^5} = \sqrt{5^4 \cdot 5} = 5^2 \cdot \sqrt{5} = 25\sqrt{5}$
- h) $(\sqrt{6})^8 = \sqrt{6^8} = 6^4 = 1296$
- i) $(\sqrt{2})^9 = \sqrt{2^9} = \sqrt{2^8 \cdot 2} = 2^4 \cdot \sqrt{2} = 16\sqrt{2}$

Lösung A2

- a) $(\sqrt{3})^3 = \sqrt{3^3} = \sqrt{3^2 \cdot 3} = 3\sqrt{3}$
- b) $(\sqrt{5})^8 = \sqrt{5^8} = 5^4 = 625$
- c) $(\sqrt{2})^{13} = \sqrt{2^{13}} = \sqrt{2^{12} \cdot 2} = 2^6 \cdot \sqrt{2} = 64\sqrt{2}$
- d) $(\sqrt{a})^6 = \sqrt{a^6} = a^3$
- e) $(\sqrt{a^2 b})^4 = \sqrt{(a^2 b)^4} = \sqrt{a^8 b^4} = a^4 b^2$
- f) $(\sqrt{a^2 b})^3 = \sqrt{(a^2 b)^3} = \sqrt{a^6 b^3} = a^4 b \sqrt{b}$
- g) $(\sqrt{x^3})^5 = \sqrt{(x^3)^5} = \sqrt{x^{15}} = \sqrt{x^{14} \cdot x} = x^7 \sqrt{x}$
- h) $(\sqrt{2x})^3 = \sqrt{(2x)^3} = \sqrt{2^3 \cdot x^3} = \sqrt{(2x)^2 \cdot 2x} = 2x\sqrt{2x}$
- i) $(\sqrt{2x})^6 = \sqrt{(2x)^6} = \sqrt{2^6 \cdot x^6} = 8x^3$

Lösung A3

- a) $(\sqrt{3x^3 y^5})^5 = \sqrt{(3x^3 y^5)^5} = \sqrt{3^5 x^{15} y^{25}} = \sqrt{3^4 \cdot 3 \cdot x^{14} \cdot x \cdot y^{24} \cdot y} = 81x^7 y^{12} \sqrt{3xy}$
- b) $(\sqrt{5ab^2})^8 = \sqrt{(5ab^2)^8} = \sqrt{5^8 a^8 b^{16}} = 5^4 a^4 b^8 = 625a^4 b^8$
- c) $(\sqrt{5ab^2})^7 = \sqrt{(5ab^2)^7} = \sqrt{5^7 a^7 b^{14}} = \sqrt{5^6 \cdot 5 \cdot a^6 \cdot a \cdot b^{14}} = 125a^3 b^7 \sqrt{5a}$
- d) $(\sqrt{a+b})^3 = \sqrt{(a+b)^3} = \sqrt{(a+b)^2 \cdot (a+b)} = (a+b)\sqrt{a+b}$
- e) $(\sqrt{a-b})^4 = \sqrt{(a-b)^4} = (a-b)^2 = a^2 - 2ab + b^2$
- f) $(\sqrt{2})^4 = \sqrt{2^4} = 2^2 = 4$
- g) $(\sqrt[3]{2})^6 = \sqrt[3]{2^6} = 2^2 = 4$

Lösung A4

- a) $(\sqrt[4]{4})^2 = \sqrt[4]{4^2} = \sqrt[4]{16} = 2$
- b) $(\sqrt[5]{7})^5 = \sqrt[5]{7^5} = 7$
- c) $(\sqrt[6]{9})^6 = \sqrt[6]{9^6} = 9$
- d) $(\sqrt[5]{a})^4 = \sqrt[5]{a^4}$
- e) $(\sqrt[4]{b})^4 = \sqrt[4]{b^4} = b$
- f) $(\sqrt[3]{x})^5 = \sqrt[3]{x^5} = \sqrt[3]{x^3 \cdot x^2} = x\sqrt[3]{x^2}$
- g) $(\sqrt[3]{y^2})^3 = \sqrt[3]{y^6} = y^2$
- h) $(\sqrt[5]{z^2})^3 = \sqrt[5]{(z^2)^3} = \sqrt[5]{z^5 \cdot z} = z\sqrt[5]{z}$