

### Lösung A1

- a)  $\sqrt{a+b} \cdot \sqrt{(a+b)^3} = \sqrt{(a+b)^4} = (a+b)^2$
- b)  $\sqrt{3(x-y)} \cdot \sqrt{27(x-y)} = \sqrt{3(x-y)} \cdot 3\sqrt{3(x-y)} = 3 \cdot 3(x-y) = 9(x-y)$
- c)  $\sqrt{\frac{2}{3x+7y}} \cdot \sqrt{\frac{7y+3x}{2}} = \sqrt{\frac{2 \cdot (7y+3x)}{(3x+7y) \cdot 2}} = \sqrt{1} = 1$
- d)  $\sqrt{\frac{1}{14x}} \cdot \sqrt{\frac{2x}{7}} \cdot \sqrt{\frac{8x^4}{98}} = \sqrt{\frac{2x \cdot 8x^4}{14x \cdot 7 \cdot 98}} = \sqrt{\frac{4x \cdot 4x^4}{2 \cdot 7 \cdot x \cdot 7 \cdot 98}} = \sqrt{\frac{4x^4}{49 \cdot 49}} = \frac{2x^2}{49}$
- e)  $2\sqrt{75} - 4\sqrt{12} + \sqrt{3} = 2\sqrt{25 \cdot 3} - 4\sqrt{4 \cdot 3} + \sqrt{3} = 10\sqrt{3} - 8\sqrt{3} + \sqrt{3} = 3\sqrt{3}$
- f)  $(2x+y)\sqrt{98} + \sqrt{8x^2 + 8xy + 2y^2} = (2x+y)\sqrt{49 \cdot 2} + \sqrt{2(2x+y)^2} =$   
 $7 \cdot (2x+y)\sqrt{2} + (2x+y)\sqrt{2} = 8 \cdot (2x+y)\sqrt{2}$
- g)  $\sqrt{32} + \sqrt{50} - \sqrt{128} + \sqrt{18} = \sqrt{16 \cdot 2} + \sqrt{25 \cdot 2} - \sqrt{64 \cdot 2} + \sqrt{9 \cdot 2} = 4\sqrt{2}$
- h)  $3\sqrt{2a^3b^2} - \sqrt{8a^3b^2} - \sqrt{72a^3b^2} = 3ab\sqrt{2a} - 2ab\sqrt{2a} - 6ab\sqrt{2a} = -5ab\sqrt{2a}$

### Lösung A2

- a)  $(a\sqrt{a+b} - b\sqrt{a-b})^2 - (b\sqrt{a+b} - a\sqrt{a-b})^2 =$   
 $a^2(a+b) - 2ab\sqrt{a^2-b^2} + b^2(a-b) - (b^2(a+b) - 2ab\sqrt{a^2-b^2} + a^2(a-b)) =$   
 $a^2(a+b) - a^2(a-b) + b^2(a-b) - b^2(a+b) = a^2(a^2-b^2) + b^2(a^2-b^2) =$   
 $(a^2-b^2)(a^2+b^2) = a^4 - b^4$
- b)  $(3\sqrt{2x+y} + \sqrt{2x-y})(3\sqrt{2x+y} - \sqrt{2x-y}) + (3\sqrt{2x+y} - \sqrt{2x-y})^2 =$   
 $(3\sqrt{2x+y})^2 - (\sqrt{2x-y})^2 + (3\sqrt{2x+y})^2 - 6\sqrt{(2x+y)(2x-y)} + (\sqrt{2x-y})^2 =$   
 $18(2x+y) - 6\sqrt{4x^2-y^2}$
- c)  $\sqrt{a+b} + \sqrt[3]{a+b} - \sqrt{a-b} + \sqrt[3]{a-b} - 3\sqrt[3]{a+b} + 2\sqrt{a+b} + \sqrt{a-b} =$   
 $3\sqrt{a+b} - 2\sqrt[3]{a+b} + \sqrt[3]{a-b}$
- d)  $\sqrt[3]{x^2 \cdot \sqrt[4]{x^3}} \cdot \sqrt{x \cdot \sqrt[3]{x^2 \cdot \sqrt[4]{x^{12}}}} \cdot \sqrt{x^3 \cdot \sqrt[3]{x^4}} \cdot \sqrt[12]{x^7} =$   
 $\sqrt[3]{x^2 \cdot \sqrt[4]{x^3}} \cdot \sqrt{x \cdot \sqrt[3]{x^5}} \cdot \sqrt{x^4 \cdot \sqrt[3]{x}} \cdot \sqrt[12]{x^7} = \sqrt[3]{x^2} \cdot \sqrt[12]{x^3} \cdot x^6 \sqrt{x^2} \cdot x^2 \sqrt[6]{x} \cdot \sqrt[12]{x^7} =$   
 $\sqrt[12]{x^8} \cdot \sqrt[12]{x^3} \cdot x^1 \sqrt[12]{x^4} \cdot x^2 \sqrt[12]{x^2} \cdot \sqrt[12]{x^7} = x^3 \cdot \sqrt[12]{x^8 \cdot x^3 \cdot x^4 \cdot x^2 \cdot x^7} = x^3 \cdot \sqrt[12]{x^{24}} = x^5$

### Lösung A3

1.	$a \cdot \sqrt{a} ==>$	C	$a^{1,5}$
2.	$a^2 \cdot \sqrt{a} ==>$	A	$a^{2,5}$
3.	$\frac{a}{\sqrt{a}} ==>$	G	$a^{0,5}$
4.	$\frac{\sqrt{a}}{a} ==>$	F	$a^{-0,5}$
5.	$\left(\frac{a}{\sqrt{a}}\right)^2 ==>$	E	$a$
6.	$\frac{\sqrt{a}}{a^2} ==>$	D	$a^{-1,5}$
7.	$\sqrt{\frac{1}{a^2}} ==>$	B	$a^{-1}$

Lösung A4

$$5k \sqrt{\frac{1}{2k} e^{-0,5}} = 5 \sqrt{\frac{k^2}{2k} \cdot \frac{1}{e^{0,5}}} = 5 \sqrt{\frac{k}{2} \cdot \frac{1}{\sqrt{e}}} = 5 \sqrt{\frac{k}{2e}}$$

q.e.d.

Lösung A5

$$\begin{array}{c|c|c|c|c} 0,5^{2,4} \approx \frac{1}{6} & 3^{-3,2} \approx \frac{1}{27} & 2^{-3,2} \approx \frac{1}{8} & 3^{-4,2} \approx \frac{1}{81} & 5^{-3,2} \approx \frac{1}{125} \\ 0,5^{2,4} > 2^{-3,2} > 3^{-3,2} > 3^{-4,2} > 5^{-3,2} \end{array}$$