

# Aufgaben Potenzen und Wurzeln III Wurzelterme vereinfachen

<p>1. Vereinfachen Sie</p> <p>a) <math>\sqrt{50}</math></p> <p>b) <math>3\sqrt{7} - \sqrt{112}</math></p> <p>c) <math>\sqrt{8x^2} + \frac{x}{2}\sqrt{2}</math></p> <p>d) <math>\sqrt{a^7} - \sqrt{9a^3}</math></p>	<p>2. Vereinfachen Sie</p> <p>a) <math>\sqrt{3} \cdot \sqrt{27k}</math></p> <p>b) <math>(3\sqrt{a} + x\sqrt{a})\sqrt{a}</math></p> <p>c) <math>(\sqrt{3} - \sqrt{5})^2</math></p> <p>d) <math>(\sqrt{50} + \sqrt{18}) : \sqrt{2}</math></p>	<p>3. Vereinfachen Sie</p> <p>a) <math>(\sqrt{3x} - \sqrt{12x}) : \sqrt{x}</math></p>
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## 1. Ausführliche Lösungen

a)  
$$\sqrt{50} = \sqrt{25 \cdot 2} = \underline{\underline{5\sqrt{2}}}$$

b)  
$$3\sqrt{7} - \sqrt{112} = 3\sqrt{7} - \sqrt{16 \cdot 7}$$
  
$$= 3\sqrt{7} - 4\sqrt{7} = \underline{\underline{-\sqrt{7}}}$$

c)  
$$\sqrt{8x^2} + \frac{x}{2}\sqrt{2} = \sqrt{4 \cdot 2x^2} + \frac{1}{2}x\sqrt{2}$$
  
$$= 2x\sqrt{2} + \frac{1}{2}x\sqrt{2}$$
  
$$= \underline{\underline{2,5x\sqrt{2}}}$$

d)  
$$\sqrt{a^7} - \sqrt{9a^3} = \sqrt{a^6 \cdot a} - \sqrt{3^2 a^2 \cdot a}$$
  
$$= a^3\sqrt{a} - 3a\sqrt{a}$$
  
$$= \underline{\underline{\sqrt{a}(a^3 - 3a)}}$$

## 2. a)

$$\begin{aligned} \sqrt{3} \cdot \sqrt{27k} &= \sqrt{3 \cdot 27k} \\ &= \sqrt{3^4 k} \\ &= 3^2 \sqrt{k} \\ &= \underline{\underline{9\sqrt{k}}} \end{aligned}$$

b)  
$$(3\sqrt{a} + x\sqrt{a})\sqrt{a} = 3\sqrt{a} \cdot \sqrt{a} + x\sqrt{a} \cdot \sqrt{a}$$
  
$$= 3a + x \cdot a$$
  
$$= \underline{\underline{a(3+x)}}$$

c)  
$$(\sqrt{3} - \sqrt{5})^2 = (\sqrt{3})^2 - 2 \cdot \sqrt{3} \cdot \sqrt{5} + (\sqrt{5})^2$$
  
$$= 3 - 2\sqrt{15} + 5$$
  
$$= \underline{\underline{8 - 2\sqrt{15}}}$$

d)  
$$(\sqrt{50} + \sqrt{18}) : \sqrt{2} = \frac{\sqrt{50}}{\sqrt{2}} + \frac{\sqrt{18}}{\sqrt{2}}$$
  
$$= \sqrt{\frac{50}{2}} + \sqrt{\frac{18}{2}}$$
  
$$= \sqrt{25} + \sqrt{9}$$
  
$$= 5 + 3 = \underline{\underline{8}}$$

## 3.a

$$\begin{aligned} (\sqrt{3x} - \sqrt{12x}) : \sqrt{x} &= \frac{\sqrt{3x}}{\sqrt{x}} - \frac{\sqrt{12x}}{\sqrt{x}} \\ &= \sqrt{\frac{3x}{x}} - \sqrt{\frac{12x}{x}} \\ &= \sqrt{3} - \sqrt{12} \\ &= \sqrt{3} - \sqrt{4 \cdot 3} \\ &= \sqrt{3} - 2\sqrt{3} \\ &= \underline{\underline{-\sqrt{3}}} \end{aligned}$$