

Mathematik Klasse 9

Hausaufgaben Seite 52:

Aufgabe 2:

- a) $\sqrt{3} \cdot \sqrt{27} = \sqrt{3 \cdot 27} = \sqrt{81} = 9$
- b) $\sqrt{3} \cdot \sqrt{75} = \sqrt{3 \cdot 75} = \sqrt{225} = 15$
- c) $\sqrt{5} \cdot \sqrt{45} = \sqrt{5 \cdot 45} = \sqrt{225} = 15$
- d) $\sqrt{6} \cdot \sqrt{54} = \sqrt{6 \cdot 54} = \sqrt{324} = 18$
- e) $\sqrt{12} \cdot \sqrt{27} = \sqrt{12 \cdot 27} = \sqrt{324} = 18$
- f) $\sqrt{32} \cdot \sqrt{8} = \sqrt{32 \cdot 8} = \sqrt{256} = 16$
- g) $\sqrt{10} \cdot \sqrt{2,5} = \sqrt{10 \cdot 2,5} = \sqrt{25} = 5$
- h) $\sqrt{30} \cdot \sqrt{1,2} = \sqrt{30 \cdot 1,2} = \sqrt{36} = 6$
- i) $\sqrt{4,9} \cdot \sqrt{0,4} = \sqrt{4,9 \cdot 0,4} = \sqrt{1,96} = 1,4$
- j) $\sqrt{0,1} \cdot \sqrt{6,4} = \sqrt{0,1 \cdot 6,4} = \sqrt{0,64} = 0,8$
- o) $\sqrt{\frac{375}{343}} \cdot \sqrt{\frac{35}{48}} = \sqrt{\frac{375}{343} \cdot \frac{35}{48}} = \sqrt{\frac{125}{49} \cdot \frac{5}{16}} = \sqrt{\frac{25 \cdot 5 \cdot 5}{49 \cdot 16}} = \frac{5 \cdot 5}{7 \cdot 4} = \frac{25}{28}$

Aufgabe 3:

- a) $\sqrt{12} : \sqrt{3} = \sqrt{12 : 3} = \sqrt{4} = 2$
- b) $\sqrt{63} : \sqrt{7} = \sqrt{63 : 7} = \sqrt{9} = 3$
- c) $\sqrt{375} : \sqrt{15} = \sqrt{\frac{375}{15}} = \sqrt{25} = 5$
- d) $\sqrt{720} : \sqrt{5} = \sqrt{\frac{720}{5}} = \sqrt{144} = 12$
- e) $\sqrt{1452} : \sqrt{12} = \sqrt{\frac{1452}{12}} = \sqrt{121} = 11$
- j) $\frac{\sqrt{1728}}{\sqrt{27}} = \sqrt{\frac{1728}{27}} = \sqrt{64} = 8$

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Aufgabe 4:

- a) $\sqrt{2500} = \sqrt{25 \cdot 100} = \sqrt{25} \cdot \sqrt{100} = 5 \cdot 10 = 50$
- b) $\sqrt{1600} = \sqrt{16 \cdot 100} = \sqrt{16} \cdot \sqrt{100} = 4 \cdot 10 = 40$
- c) $\sqrt{14400} = \sqrt{144 \cdot 100} = \sqrt{144} \cdot \sqrt{100} = 12 \cdot 10 = 120$
- d) $\sqrt{784} = \sqrt{16 \cdot 49} = \sqrt{16} \cdot \sqrt{49} = 4 \cdot 7 = 28$
- e) $\sqrt{1225} = \sqrt{25 \cdot 49} = \sqrt{25} \cdot \sqrt{49} = 5 \cdot 7 = 35$

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Aufgabe 4:

- f) $\sqrt{0,36} = \sqrt{\frac{36}{100}} = \frac{\sqrt{36}}{\sqrt{100}} = \frac{6}{10} = 0,6$
- g) $\sqrt{0,81} = \sqrt{\frac{81}{100}} = \frac{\sqrt{81}}{\sqrt{100}} = \frac{9}{10} = 0,9$
- h) $\sqrt{0,49} = \sqrt{\frac{49}{100}} = \frac{\sqrt{49}}{\sqrt{100}} = \frac{7}{10} = 0,7$
- i) $\sqrt{0,0144} = \sqrt{\frac{144}{10000}} = \frac{\sqrt{144}}{\sqrt{10000}} = \frac{12}{100} = 0,12$
- j) $\sqrt{1,44} = \sqrt{\frac{144}{100}} = \frac{\sqrt{144}}{\sqrt{100}} = \frac{12}{10} = 1,2$
- o) $\sqrt{12,96} = \sqrt{\frac{1296}{100}} = \frac{\sqrt{1296}}{\sqrt{100}} = \frac{36}{10} = 3,6$

Aufgabe 5:

- a) $\sqrt{8} = \sqrt{4 \cdot 2} = \sqrt{4} \cdot \sqrt{2} = 2 \cdot \sqrt{2}$
- b) $\sqrt{24} = \sqrt{4 \cdot 6} = \sqrt{4} \cdot \sqrt{6} = 2 \cdot \sqrt{6}$
- c) $\sqrt{28} = \sqrt{4 \cdot 7} = \sqrt{4} \cdot \sqrt{7} = 2 \cdot \sqrt{7}$
- d) $\sqrt{32} = \sqrt{16 \cdot 2} = \sqrt{16} \cdot \sqrt{2} = 4 \cdot \sqrt{2}$
- e) $\sqrt{40} = \sqrt{4 \cdot 10} = \sqrt{4} \cdot \sqrt{10} = 2 \cdot \sqrt{10}$
- f) $\sqrt{45} = \sqrt{9 \cdot 5} = \sqrt{9} \cdot \sqrt{5} = 3 \cdot \sqrt{5}$
- g) $\sqrt{54} = \sqrt{9 \cdot 6} = \sqrt{9} \cdot \sqrt{6} = 3 \cdot \sqrt{6}$
- h) $\sqrt{72} = \sqrt{36 \cdot 2} = \sqrt{36} \cdot \sqrt{2} = 6 \cdot \sqrt{2}$
- i) $\sqrt{80} = \sqrt{16 \cdot 5} = \sqrt{16} \cdot \sqrt{5} = 4 \cdot \sqrt{5}$
- j) $\sqrt{88} = \sqrt{4 \cdot 22} = \sqrt{4} \cdot \sqrt{22} = 2 \cdot \sqrt{22}$
- k) $\sqrt{90} = \sqrt{9 \cdot 10} = \sqrt{9} \cdot \sqrt{10} = 3 \cdot \sqrt{10}$
- l) $\sqrt{92} = \sqrt{4 \cdot 23} = \sqrt{4} \cdot \sqrt{23} = 2 \cdot \sqrt{23}$
- p) $\sqrt{375} = \sqrt{25 \cdot 15} = \sqrt{25} \cdot \sqrt{15} = 5 \cdot \sqrt{15}$

Aufgabe 6:

- a) $\sqrt{500} = \sqrt{100 \cdot 5} = \sqrt{100} \cdot \sqrt{5} = 10 \cdot \sqrt{5}$
- b) $\sqrt{600} = \sqrt{100 \cdot 6} = \sqrt{100} \cdot \sqrt{6} = 10 \cdot \sqrt{6}$
- c) $\sqrt{575} = \sqrt{25 \cdot 23} = \sqrt{25} \cdot \sqrt{23} = 5 \cdot \sqrt{23}$
- d) $\sqrt{775} = \sqrt{25 \cdot 31} = \sqrt{25} \cdot \sqrt{31} = 5 \cdot \sqrt{31}$
- e) $\sqrt{1000} = \sqrt{100 \cdot 10} = \sqrt{100} \cdot \sqrt{10} = 10 \cdot \sqrt{10}$
- f) $\sqrt{2112} = \sqrt{64 \cdot 33} = \sqrt{64} \cdot \sqrt{33} = 8 \cdot \sqrt{33}$
- i) $\sqrt{15300} = \sqrt{900 \cdot 17} = \sqrt{900} \cdot \sqrt{17} = 30 \cdot \sqrt{17}$

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Aufgabe 7:

$$\begin{aligned} \text{a)} \quad \sqrt{250\,000\,000\,000} &= \sqrt{25 \cdot 10\,000\,000\,000} \\ &= 5 \cdot 100\,000 = 500\,000 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad \sqrt{256\,000\,000\,000\,000} &= \sqrt{256 \cdot 100\,000\,000\,000} \\ &= 16 \cdot 1\,000\,000 = 16\,000\,000 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad \sqrt{49\,000\,000\,000\,000} &= \sqrt{49 \cdot 100\,000\,000\,000} \\ &= 7 \cdot 1\,000\,000 = 7\,000\,000 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad \sqrt{0,000\,000\,004\,9} &= \sqrt{49 \cdot 0,000\,000\,001} \\ &= 7 \cdot 0,000\,01 = 0,000\,07 \end{aligned}$$

$$\begin{aligned} \text{e)} \quad \sqrt{0,000\,000\,000\,225} &= \sqrt{225 \cdot 0,000\,000\,001} \\ &= 15 \cdot 0,000\,001 = 0,000\,015 \end{aligned}$$

$$\begin{aligned} \text{f)} \quad \sqrt{0,000\,000\,000\,002\,89} &= \sqrt{289 \cdot 0,000\,000\,000\,001} \\ &= 17 \cdot 0,000\,000\,01 = 0,000\,001\,7 \end{aligned}$$

$$\begin{aligned} \text{l)} \quad \sqrt{0,000\,000\,000\,008\,1} &= \sqrt{81 \cdot 0,000\,000\,000\,001} \\ &= \sqrt{81 \cdot 0,1 \cdot 0,000\,000\,000\,001} \\ &= 9 \cdot \sqrt{0,1} \cdot 0,000\,001 \\ &= 0,000\,009 \cdot \sqrt{0,1} \end{aligned}$$

Aufgabe 8:

$$\text{a)} \quad \frac{2}{\sqrt{2}} = \frac{2 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{2 \cdot \sqrt{2}}{2} = \sqrt{2}$$

$$\text{b)} \quad \frac{3}{\sqrt{6}} = \frac{3 \cdot \sqrt{6}}{\sqrt{6} \cdot \sqrt{6}} = \frac{3 \cdot \sqrt{6}}{6} = \frac{1}{2} \cdot \sqrt{6}$$

$$\text{c)} \quad \frac{5}{\sqrt{5}} = \frac{5 \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{5 \cdot \sqrt{5}}{5} = \sqrt{5}$$

$$\text{d)} \quad \frac{4}{\sqrt{2}} = \frac{4 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{4 \cdot \sqrt{2}}{2} = 2 \cdot \sqrt{2}$$

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Aufgabe 8:

e) $\frac{10}{\sqrt{5}} = \frac{10 \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{10 \cdot \sqrt{5}}{5} = 2 \cdot \sqrt{5}$

f) $\frac{12}{\sqrt{6}} = \frac{12 \cdot \sqrt{6}}{\sqrt{6} \cdot \sqrt{6}} = \frac{12 \cdot \sqrt{6}}{6} = 2 \cdot \sqrt{6}$

g) $\frac{15}{\sqrt{10}} = \frac{15 \cdot \sqrt{10}}{\sqrt{10} \cdot \sqrt{10}} = \frac{15 \cdot \sqrt{10}}{10} = \frac{3}{2} \cdot \sqrt{10}$

h) $\frac{20}{\sqrt{15}} = \frac{20 \cdot \sqrt{15}}{\sqrt{15} \cdot \sqrt{15}} = \frac{20 \cdot \sqrt{15}}{15} = \frac{4}{3} \cdot \sqrt{15}$

p) $\frac{105}{\sqrt{210}} = \frac{105 \cdot \sqrt{210}}{\sqrt{210} \cdot \sqrt{210}} = \frac{105 \cdot \sqrt{210}}{210} = \frac{1}{2} \cdot \sqrt{210}$

Aufgabe 9:

a) $\frac{72}{\sqrt{48}} = \frac{72}{\sqrt{16 \cdot 3}} = \frac{72}{4 \cdot \sqrt{3}} = \frac{18}{\sqrt{3}} = \frac{18 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{18 \cdot \sqrt{3}}{3} = 6 \cdot \sqrt{3}$

b) $\frac{27}{\sqrt{63}} = \frac{27}{\sqrt{9 \cdot 7}} = \frac{27}{3 \cdot \sqrt{7}} = \frac{9}{\sqrt{7}} = \frac{9 \cdot \sqrt{7}}{\sqrt{7} \cdot \sqrt{7}} = \frac{9 \cdot \sqrt{7}}{7} = \frac{9}{7} \cdot \sqrt{7}$

c) $\frac{75}{\sqrt{250}} = \frac{75}{\sqrt{25 \cdot 10}} = \frac{75}{5 \cdot \sqrt{10}} = \frac{15}{\sqrt{10}} = \frac{15 \cdot \sqrt{10}}{\sqrt{10} \cdot \sqrt{10}} = \frac{15 \cdot \sqrt{10}}{10} = \frac{3}{2} \cdot \sqrt{10}$

d) $\frac{96}{\sqrt{240}} = \frac{96}{\sqrt{16 \cdot 15}} = \frac{96}{4 \cdot \sqrt{15}} = \frac{24}{\sqrt{15}} = \frac{24 \cdot \sqrt{15}}{\sqrt{15} \cdot \sqrt{15}} = \frac{24 \cdot \sqrt{15}}{15} = \frac{8}{5} \cdot \sqrt{15}$

e) $\frac{192}{\sqrt{768}} = \frac{192}{\sqrt{256 \cdot 3}} = \frac{192}{16 \cdot \sqrt{3}} = \frac{12}{\sqrt{3}} = \frac{12 \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{12 \cdot \sqrt{3}}{3} = 4 \cdot \sqrt{3}$

f) $\frac{525}{\sqrt{245}} = \frac{525}{\sqrt{49 \cdot 5}} = \frac{525}{7 \cdot \sqrt{5}} = \frac{75}{\sqrt{5}} = \frac{75 \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{75 \cdot \sqrt{5}}{5} = 15 \cdot \sqrt{5}$

g) $\frac{10 \cdot \sqrt{3}}{\sqrt{175}} = \frac{10 \cdot \sqrt{3}}{\sqrt{25 \cdot 7}} = \frac{10 \cdot \sqrt{3}}{5 \cdot \sqrt{7}} = \frac{2 \cdot \sqrt{3}}{\sqrt{7}} = \frac{2 \sqrt{3} \sqrt{7}}{\sqrt{7} \sqrt{7}} = \frac{2 \sqrt{21}}{7} = \frac{2}{7} \sqrt{21}$

h) $\frac{54 \cdot \sqrt{33}}{\sqrt{297}} = \frac{54 \cdot \sqrt{33}}{\sqrt{9 \cdot 33}} = \frac{54 \cdot \sqrt{33}}{3 \cdot \sqrt{33}} = \frac{54}{3} = 18$

i) $\frac{\sqrt{275}}{\sqrt{990}} = \frac{\sqrt{25 \cdot 11}}{\sqrt{9 \cdot 10 \cdot 11}} = \frac{5 \sqrt{11}}{3 \sqrt{10} \sqrt{11}} = \frac{5}{3 \sqrt{10}} = \frac{5 \sqrt{10}}{3 \sqrt{10} \sqrt{10}} = \frac{5 \sqrt{10}}{30} = \frac{1}{6} \sqrt{10}$

l) $\frac{48 \cdot \sqrt{960}}{\sqrt{2400}} = \frac{48 \cdot \sqrt{64 \cdot 15}}{\sqrt{400 \cdot 6}} = \frac{48 \cdot 8 \cdot \sqrt{15}}{20 \cdot \sqrt{6}} = \frac{96 \cdot \sqrt{15}}{5 \cdot \sqrt{6}} = \frac{96 \cdot \sqrt{15} \cdot \sqrt{6}}{5 \cdot \sqrt{6} \cdot \sqrt{6}} = \frac{96 \cdot \sqrt{90}}{5 \cdot 6}$
 $= \frac{96 \cdot \sqrt{9 \cdot 10}}{30} = \frac{96 \cdot 3 \cdot \sqrt{10}}{30} = \frac{48}{5} \cdot \sqrt{10}$

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Aufgabe 10:

$$\text{a) } \sqrt{\frac{7}{3}} = \frac{\sqrt{7}}{\sqrt{3}} = \frac{\sqrt{7} \cdot \sqrt{3}}{\sqrt{3} \cdot \sqrt{3}} = \frac{\sqrt{21}}{3} = \frac{1}{3} \cdot \sqrt{21}$$

$$\text{b) } \sqrt{\frac{15}{12}} = \sqrt{\frac{5}{4}} = \frac{\sqrt{5}}{\sqrt{4}} = \frac{\sqrt{5}}{2} = \frac{1}{2} \cdot \sqrt{5}$$

$$\text{c) } \sqrt{\frac{18}{7}} = \frac{\sqrt{18}}{\sqrt{7}} = \frac{\sqrt{9 \cdot 2}}{\sqrt{7}} = \frac{3 \cdot \sqrt{2}}{\sqrt{7}} = \frac{3 \cdot \sqrt{2} \cdot \sqrt{7}}{\sqrt{7} \cdot \sqrt{7}} = \frac{3 \cdot \sqrt{14}}{7} = \frac{3}{7} \cdot \sqrt{14}$$

$$\text{d) } \sqrt{\frac{54}{125}} = \frac{\sqrt{54}}{\sqrt{125}} = \frac{\sqrt{9 \cdot 6}}{\sqrt{25 \cdot 5}} = \frac{3 \cdot \sqrt{6}}{5 \cdot \sqrt{5}} = \frac{3 \cdot \sqrt{6} \cdot \sqrt{5}}{5 \cdot \sqrt{5} \cdot \sqrt{5}} = \frac{3 \cdot \sqrt{30}}{5 \cdot 5} = \frac{3}{25} \cdot \sqrt{30}$$

$$\text{e) } \sqrt{\frac{75}{343}} = \frac{\sqrt{75}}{\sqrt{343}} = \frac{\sqrt{25 \cdot 3}}{\sqrt{49 \cdot 7}} = \frac{5 \cdot \sqrt{3}}{7 \cdot \sqrt{7}} = \frac{5 \cdot \sqrt{3} \cdot \sqrt{7}}{7 \cdot \sqrt{7} \cdot \sqrt{7}} = \frac{5 \cdot \sqrt{21}}{7 \cdot 7} = \frac{5}{49} \cdot \sqrt{21}$$

$$\text{f) } \sqrt{\frac{66}{35}} = \frac{\sqrt{66}}{\sqrt{35}} = \frac{\sqrt{66} \cdot \sqrt{35}}{\sqrt{35} \cdot \sqrt{35}} = \frac{\sqrt{66 \cdot 35}}{35} = \frac{\sqrt{2310}}{35} = \frac{1}{35} \cdot \sqrt{2310}$$

$$\text{g) } \sqrt{\frac{126}{125}} = \frac{\sqrt{126}}{\sqrt{125}} = \frac{\sqrt{9 \cdot 14}}{\sqrt{25 \cdot 5}} = \frac{3 \cdot \sqrt{14}}{5 \cdot \sqrt{5}} = \frac{3 \cdot \sqrt{14} \cdot \sqrt{5}}{5 \cdot \sqrt{5} \cdot \sqrt{5}} = \frac{3 \cdot \sqrt{70}}{5 \cdot 5} = \frac{3}{25} \cdot \sqrt{70}$$

$$\text{h) } \sqrt{\frac{143}{375}} = \frac{\sqrt{143}}{\sqrt{375}} = \frac{\sqrt{143}}{\sqrt{25 \cdot 15}} = \frac{\sqrt{143}}{5 \cdot \sqrt{15}} = \frac{\sqrt{143} \cdot \sqrt{15}}{5 \cdot \sqrt{15} \cdot \sqrt{15}} = \frac{\sqrt{2145}}{5 \cdot 15} = \frac{1}{75} \cdot \sqrt{2145}$$

$$\begin{aligned} \text{p) } \sqrt{6,125} &= \sqrt{\frac{6125}{1000}} = \frac{\sqrt{6125}}{\sqrt{1000}} = \frac{\sqrt{1225 \cdot 5}}{\sqrt{100 \cdot 10}} = \frac{35 \cdot \sqrt{5}}{10 \cdot \sqrt{10}} = \frac{7 \cdot \sqrt{5}}{2 \cdot \sqrt{10}} \\ &= \frac{7 \cdot \sqrt{5} \cdot \sqrt{10}}{2 \cdot \sqrt{10} \cdot \sqrt{10}} = \frac{7 \cdot \sqrt{50}}{2 \cdot 10} = \frac{7 \cdot \sqrt{25 \cdot 2}}{20} = \frac{7 \cdot 5 \cdot \sqrt{2}}{20} = \frac{7}{4} \cdot \sqrt{2} \end{aligned}$$