**Potenzen mit rationalem Exponenten III**

1. Aufgabe: Rechne so weit wie möglich aus.

a) $12·\sqrt[3]{216} + 18·\sqrt[3]{216}$ = 30 · 6 = 180

b) $15·\sqrt[3]{343} + 5·\sqrt[3]{343}$ = 20 · 7 = 140

c) $111·\sqrt[3]{512}- 11·\sqrt[3]{512}$ = 100 ·8 = 800

d) $120·\sqrt[3]{64}- 30·\sqrt[3]{64}$ = 90 ·4 = 360

e) (y + 2)$ \sqrt[3]{512}$ - (y - 2)$ \sqrt[3]{512}$ = 8y · 8 = 64y

f) (y + 4)²$ \sqrt[3]{-8}$ -(y + 4)²$ \sqrt[3]{-8}$ = 0 ·$\sqrt[3]{-8}$ = 0

g) (x+9)(x-9)$ \sqrt[3]{\frac{27}{64}}$ + 31·$\sqrt[3]{\frac{27}{64}}$ = 0,75(x² - 50)

 = 0,75x² - 37,5

h) (b + 6)² $\sqrt[3]{\frac{2^{12}}{2^{15}}}$ - (b + 4)² $\sqrt[3]{\frac{2^{12}}{2^{15}}}$ = 0,5(4b + 20)

 = 2b + 10

2. Aufgabe: Rechne so weit wie möglich. Schreibe das Ergebnis mit rationalem Exponenten.

|  |
| --- |
| a) $\frac{\sqrt[3]{\frac{b^{5}x^{5}y^{5}}{243}}}{\sqrt[3]{\frac{3^{5}}{4^{5}}}}$ = $\frac{\sqrt[3]{b^{5}x^{5}y^{5}·4^{5}}}{\sqrt[3]{3^{5}·243}}$ = $\frac{2bx\sqrt[3]{b^{2}x^{2}y^{2}·4^{2}}}{3·3\sqrt[3]{3^{2}·9}}$ = $\frac{2bx}{27}·\left(\frac{b^{2}x^{2}y^{2}·16}{3}\right)^{\frac{1}{3}}$ |
| b) $\frac{\sqrt[4]{x^{4}:x^{8}}}{\sqrt[4]{b^{8}:b^{16}}}$ = $\frac{\sqrt[4]{x^{-4}}}{\sqrt[4]{b^{-8}}}$ = $\left(\frac{b^{8}}{x^{4}}\right)^{\frac{1}{4}}$ = $\frac{b²}{x}$ = b²x-1  |
| c) $\frac{\sqrt[5]{(xy)^{15}}}{\sqrt[5]{3125(xy)^{10}}}$ = $\frac{(xy)³}{5(xy)²}$ = 0,2xy |
| d) $\sqrt[5]{\frac{243(a^{2}b^{2})^{5}}{7776a^{10}b^{5}}}$ = $\frac{3a²b²}{6a²b}$ = b |
| e) $\sqrt[4]{\frac{(a+b)^{4}·(a-b)^{4}}{(b-a)^{4}·(b+a)^{4}}}$= $\frac{(a+b)(a-b)}{(b-a)(b+a)}$ = $\frac{a²-b²}{b²-a²}$ |