

## Aufgabe 16

$$(a) 2^3 + 3^3 = 8 + 27 = \underline{\underline{35}}$$

$$(2+3)^3 = \underline{\underline{125}}$$

$$2^{(3^2)} = 2^9 = \underline{\underline{512}}$$

$$(2^3)^2 = 8^2 = 64$$

$$b) (3^2 + 2^2)^0 = 1$$

$$(3^0 + 2^0)^2 = 2^2 = 4$$

$$\left(\frac{1}{2}\right)^{-3} = 2^3 = 8$$

$$\left(-\frac{1}{2}\right)^3 = -\frac{1}{8}$$

## Aufgabe 17

$$(a) 3 \cdot 10^5$$

$$(b) 37 \cdot 10^{-8} = 3,7 \cdot 10^{-7}$$

$$(c) 2,2 \cdot 10^{-12} - 1,2 \cdot 10^{-13}$$

$$= 2,2 \cdot 10^1 \cdot 10^{-1} \cdot 10^{-12} - 1,2 \cdot 10^{-13}$$

$$= 22 \cdot 10^{-13} - 1,2 \cdot 10^{-13}$$

$$= 20,8 \cdot 10^{-13} = 2,08 \cdot 10^{-12}$$

## Aufgabe 19

$$(a) c = 3 \cdot 10^{10} \text{ cm/s}$$

$$c = 3 \cdot 10^{10} \cdot 10^{-2} \text{ m/s}$$

$$= \underline{\underline{3 \cdot 10^8 \text{ m/s}}}$$

$$1 \text{ cm} = \frac{1}{100} \text{ m}$$

$$s = \frac{1}{60} \cdot \text{min}$$

$$1 \text{ km} = 1000 \text{ m}$$

$$\Rightarrow 1 \text{ m} = 10^{-3} \text{ km}$$

$$c = 3 \cdot 10^8 \text{ m/s} = 3 \cdot 10^8 \frac{\text{m}}{\frac{1}{60} \text{ min}} = 3 \cdot 60 \cdot 10^8 \text{ m/min} = 18 \cdot 10^9 \text{ m/min}$$

$$\begin{aligned} c &= 18 \cdot 10^6 \text{ m/min} \\ &= 18 \cdot 10^5 \text{ km/min} \\ &= 18 \cdot 10^5 \cdot 60 \text{ km/h} \\ &= 1080 \cdot 10^7 \text{ km/h} \\ &= \underline{\underline{108 \cdot 10^7 \text{ km/h}}} \end{aligned}$$

$$(b) \quad c = 3 \cdot 10^{10} \text{ cm/s}$$

$$\begin{aligned} 1 \text{ Jahr} &= 365 \cdot 24 \cdot 60 \cdot 60 \cdot 3 = 34608 \cdot 10^{13} \text{ cm} \\ &= 34608 \cdot 10^8 \text{ km} \end{aligned}$$

### Aufgabe 20

$$(c) \quad (-2^2)^3 = (-4)^3 = -64$$

$$(2^{-2})^3 = \left(\frac{1}{4}\right)^3 = \frac{1}{64}$$

$$(2^2)^{-3} = \left(\frac{1}{4}\right)^3 = \frac{1}{64}$$

$$(d) \quad (3^n + 3^{-n})^2 = 3^{2n} + 2 + 3^{-2n}$$

$$(x+y)^2(x^3-y) = (x^2 + 2xy + y^2)(x^3 - y)$$

$$\begin{aligned} &= \frac{x^5 + 2x^4y + y^2x^3}{-x^2y - 2xy^3 - y^3} \end{aligned}$$

### Aufgabe 21

$$(i) \quad (\sqrt{5} + \sqrt{3})(\sqrt{5} - \sqrt{3}) = (\sqrt{5})^2 - (\sqrt{3})^2 = 25 - 9 = \underline{\underline{16}}$$

$$(ii) \sqrt{\frac{(x+y)^3}{x+y}} = \sqrt{(x+y)^2} = \underline{\underline{|x+y|}}$$

$$(iii) \frac{\sqrt[7]{x \cdot \sqrt[4]{x^3}}}{\sqrt[4]{x \cdot \sqrt[7]{x^3}}} = \frac{x^{1/7} \cdot (x^{3/4})^{1/7}}{x^{1/4} \cdot (x^{3/7})^{1/4}} = \frac{x^{1/7} \cdot x^{\frac{3}{28}}}{x^{1/4} \cdot x^{\frac{3}{28}}}$$

$$= x^{\frac{1}{7} - \frac{1}{4}} = x^{\frac{4}{28} - \frac{7}{28}} = x^{-\frac{3}{28}}$$

$$(iv) \frac{7}{\sqrt{n} + \sqrt{n+1}} = \frac{7 \cdot (\sqrt{n} - \sqrt{n+1})}{(\sqrt{n})^2 - (\sqrt{n+1})^2} = \frac{7(\sqrt{n} - \sqrt{n+1})}{n - (n+1)} = \underline{\underline{\frac{7(\sqrt{n+1} - \sqrt{n})}{28\sqrt{x^3}}}}$$