

S. 58 / Nr. 11

$$f(x) = b \cdot a^x$$

|      |                         |                       |   |       |                    |                    |
|------|-------------------------|-----------------------|---|-------|--------------------|--------------------|
| x    | -2                      | -1                    | 0 | 1     | 2                  | 3                  |
| f(x) | $\frac{1}{a^2} \cdot b$ | $\frac{1}{a} \cdot b$ | b | a · b | a <sup>2</sup> · b | a <sup>3</sup> · b |

$f(0) = b \cdot a^0 = b \cdot 1 = b$

Diagram annotations: Blue arrows labeled '+1' show the step from x=0 to x=1, x=1 to x=2, and x=2 to x=3. Orange arrows labeled '+2' show the step from x=0 to x=2 and x=0 to x=3. Red arrows labeled '· a' show the step from f(0) to f(1), f(1) to f(2), and f(2) to f(3). Yellow arrows labeled '· a<sup>2</sup>' show the step from f(0) to f(2) and f(0) to f(3).

"alle 15 Sekunden 9% Abnahme"

|       |   |    |    |    |                       |
|-------|---|----|----|----|-----------------------|
| t [s] | 0 | 15 | 30 | 45 | 60                    |
| Höhe  | b |    |    |    | 0,91 <sup>4</sup> · b |

Diagram annotations: Orange arrows labeled '+15' show the time intervals between 0-15, 15-30, 30-45, and 45-60. A red arrow labeled '· 0,91' shows the decay factor from t=0 to t=15.

$$0,91^4 = 0,68574961$$

$$\approx 68,6\%$$

Die Säule hat sich um 31,4% verringert.

|           |    |                   |       |
|-----------|----|-------------------|-------|
| $t$ [min] | 0  | 1                 |       |
| $h$ [cm]  | 10 | $10 \cdot 0,91^4$ | ..... |

$$h(t) = 10 \cdot (0,91^4)^t = 10 \cdot 0,91^{4 \cdot t}$$

$$= 10 \cdot 0,6857 \dots^t$$

$$5 = h(T_H) = 10 \cdot 0,91^{4 \cdot T_H}$$

$$0,5 = 0,91^{4 \cdot T_H} = a^{T_H}$$

$$a^{T_H} = 0,5$$

$$T_H = \log_a(0,5) = \frac{\lg(0,5)}{\lg(a)}$$

$$= \frac{\lg(0,5)}{\lg(0,91^4)} \approx 1,83$$