

## S. 26 Nr. 3

a)

$$f(x) = 0.5 \cdot 2^x \rightarrow \text{Graph D}$$

$$f(x) = 2^x + 2 \rightarrow \text{Graph B}$$

$$f(x) = 0.5 \cdot 2^{x+1} \rightarrow \text{Graph A}$$

$$f(x) = 2^{-x} \rightarrow \text{Graph E}$$

$$f(x) = 0.5 \cdot 2^x + 1 \rightarrow \text{Graph C}$$

**Laut Lösungen richtig (S. 135)**

## S. 26 Nr. 4

$$x^{\frac{1}{2}} = \frac{1}{2} \rightarrow x = \frac{1}{4}$$

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

$$x^{-8} = 256 \rightarrow x = \frac{1}{2}$$

$$\left(\frac{1}{4}\right)^x + 3 = 5 \rightarrow x = -\frac{1}{2}$$

$$x^{\frac{3}{4}} = 27 \rightarrow x = 81$$

$$6 \cdot 2^{3-x} = 24 \rightarrow x = 1$$

**Laut Lösungen richtig (S. 135)**

## S. 26 Nr. 7

a)

$$\begin{aligned} \text{Gesamte prozentuale Steigerung} &= (1 + 0.4)^7 \\ &= 1054\% \end{aligned}$$

$$\begin{aligned} \text{Abzug der ursprünglichen 100 \%} &\rightarrow 1054\% - 100\% \\ &= 954\% \end{aligned}$$

**Laut Lösungen richtig (S. 135)**

b)

10 %:

$$(1 + 0.4)^x = 1.10$$

$$x \approx 0.2832$$

100%:

$$(1 + 0.4)^x = 2$$

$$x \approx 2.06$$

Laut Lösungen richtig (S. 135)

c)

$$10 \cdot 1.4^x = 2000$$

$$x \approx 15.74$$

Laut Lösungen richtig (S. 135)

S. 27 Nr. 1

|          |            |                 |                          |
|----------|------------|-----------------|--------------------------|
| $f(x)$   | $e^x + 3x$ | $2e^x + 0.5x^2$ | $-4e^x + \frac{1}{3}x^4$ |
| $f'(x)$  | $e^x + 3$  | $2e^x + x$      | $-4e^x + \frac{4}{3}x^3$ |
| $f''(x)$ | $e^x$      | $2e^x + 1$      | $-4e^x + 4x^2$           |

|          |                  |                                 |
|----------|------------------|---------------------------------|
| $f(x)$   | $\sin(x) - e^x$  | $\frac{1}{3} \cdot (e^x + x^2)$ |
| $f'(x)$  | $\cos(x) - e^x$  | $\frac{e^x + 2x}{3}$            |
| $f''(x)$ | $-\sin(x) - e^x$ | $\frac{e^x + 2}{3}$             |

Laut Lösungen richtig (S. 135)

S. 29 Nr. 1

b)

Die Verdoppelungszeit beträgt in etwa  $T_V \approx 2$  Jahre

**Laut Lösungen richtig (S. 136)**

S. 35 Nr. 1

a)

$$\begin{aligned}f(x) &= (x^3 + 1)(x - 4) \\u &= x^3 + 1; \quad v = x - 4; \\u' &= 3x^2; \quad v' = 1 \\f'(x) &= 3x^2 \cdot (x - 4) + 1 \cdot (x^3 + 1) \\f'(x) &= 3x^3 - 12x^2 + x^3 + 1 \\f'(x) &= 4x^3 - 12x^2 + 1\end{aligned}$$

b)

$$\begin{aligned}f(x) &= (x + 3)(2 - x) \\u &= x + 3; \quad v = 2 - x; \\u' &= 1; \quad v' = -1 \\f'(x) &= -1 \cdot (x + 3) + 1 \cdot (2 - x) \\f'(x) &= -x - 3 + 2 - x \\f'(x) &= -2x - 1\end{aligned}$$

c)

$$\begin{aligned}f(x) &= (x^4 - 2x^2 + 3)(x^2 - 4) \\u &= x^4 - 2x^2 + 3; \quad v = x^2 - 4 \\u' &= 4x^3 - 4x; \quad v' = 2x \\f'(x) &= (4x^3 - 4x) \cdot (x^2 - 4) + 2x \cdot (x^4 - 2x^2 + 3) \\f'(x) &= 4x^5 - 16x^3 - 4x^3 + 16x + 2x^5 - 4x^3 + 6x \\f'(x) &= 4x^5 + 2x^5 - 16x^3 - 4x^3 - 4x^3 + 16x + 6x \\f'(x) &= 6x^5 - 24x^3 + 22x\end{aligned}$$

## Laut Lösungen richtig (S. 140)

S. 35 Nr. 6

a)

$$f(x) = (3x - 2) \cdot \sqrt{x}; x_0 = 4$$

$$u = (3x - 2); v = \sqrt{x}$$

$$u' = 3; v' = \frac{1}{2}\sqrt{x};$$

$$f'(x) = u' \cdot v + v' \cdot u$$

$$f'(x) = 3 \cdot \sqrt{x} + \frac{1}{2\sqrt{x}} \cdot (3x - 2)$$

$$f'(x_0)$$

$$f'(4) = 3 \cdot \sqrt{4} + \frac{1}{2\sqrt{4}} \cdot (3 \cdot 4 - 2)$$

$$f'(4) = 6 + \frac{1}{4} \cdot 10$$

$$f'(4) = 6 + 2.5$$

$$f'(4) = 8.5$$

$$\Rightarrow m = 8.5$$

$$t(x) = 8.5x + b$$

$$f(x_0)$$

$$f(4) = (3 \cdot 4 - 2) \cdot \sqrt{4}$$

$$f(4) = 20$$

$$\Rightarrow 20 = 8.5 \cdot 4 + b$$

$$\Leftrightarrow 20 = 34 + b$$

$$\Leftrightarrow b = 14$$

$$\Rightarrow t(x) = 8.5x + 14$$

## Laut Lösungen richtig (S. 141)

b)

$$f(x) = \frac{1}{2}x \cdot e^x; \quad x_0 = 2$$

$$u = \frac{1}{2}x; \quad v = e^x;$$

$$u' = \frac{1}{2}; \quad v' = e^x$$

$$f'(x) = \frac{1}{2}x \cdot e^x + e^x \cdot \frac{1}{2}$$

$$f'(x_0)$$

$$f'(2) = \frac{1}{2} \cdot 2 \cdot e^2 + e^2 \cdot \frac{1}{2}$$

$$f'(2) = 1 \cdot e^2 + e^2 \cdot \frac{1}{2}$$

$$f'(2) = \frac{3}{2}e^2$$

$$\Rightarrow m = \frac{3}{2}e^2$$

$$t(x) = \frac{3}{2}e^2 \cdot x + b$$

$$f(x_0)$$

$$f(2) = \frac{1}{2} \cdot 2 \cdot e^2$$

$$f(2) = e^2$$

$$\Rightarrow P(e^2 | \frac{3}{2}e^2)$$

$$\Rightarrow e^2 = \frac{3}{2}e^2 \cdot 2 + b$$

$$\Leftrightarrow e^2 = \frac{6}{2}e^2 + b$$

$$\Leftrightarrow e^2 = 3e^2 + b$$

$$\Leftrightarrow -2e^2 = b$$

$$\Rightarrow t(x) = \frac{3}{2}e^2 \cdot x - 2e^2$$

**Laut Lösungen richtig (S. 141)**

c)

$$f(x) = \sqrt{x} \cdot (2x^2 - 4); \quad x_0 = 2$$

$$u = \sqrt{x}; \quad v = (2x^2 - 4);$$

$$u' = \frac{1}{2\sqrt{x}}; \quad v' = 4x$$

$$f'(x) = \sqrt{x} \cdot 4x + \frac{1}{2\sqrt{x}} \cdot (2x^2 - 4)$$

$$f'(x_0)$$

$$f'(2) = \sqrt{2} \cdot 4 \cdot 2 + \frac{1}{2\sqrt{2}} \cdot (2 \cdot 2^2 - 4)$$

$$f'(2) = \sqrt{2} \cdot 8 + \frac{1}{2\sqrt{2}} \cdot 4$$

$$f'(2) = \sqrt{2} \cdot 8 + \frac{4}{2\sqrt{2}}$$

$$f'(2) = \sqrt{2} \cdot 8 + \sqrt{2}$$

$$f'(2) = 9\sqrt{2}$$

$$\Rightarrow m = 9\sqrt{2}$$

$$\Rightarrow t(x) = 9\sqrt{2}x + b$$

$$f(x_0)$$

$$f(2) = \sqrt{2} \cdot (2 \cdot 2^2 - 4)$$

$$f(2) = \sqrt{2} \cdot (4)$$

$$f(2) = 4\sqrt{2}$$

$$\Rightarrow P(2|4\sqrt{2})$$

$$\Rightarrow 4\sqrt{2} = 9\sqrt{2} \cdot 2 + b$$

$$\Leftrightarrow 4\sqrt{2} = 18\sqrt{2} + b$$

$$\Leftrightarrow -14\sqrt{2} = b$$

$$\Rightarrow t(x) = 9\sqrt{2}x - 14\sqrt{2}$$

**Laut Lösungen richtig (S. 141)**