Regression: quadratisch, exponentiell, logarithmisch

Stufe 2: Parameter aus exakten Daten

Name: _____ Datum: _____

Die Daten liegen genau auf einer Kurve: Bestimme die Parameter. Exponentiell y = a · b^x (Quotienten aufeinanderfolgender y-Werte konstant), quadratisch y = ax² + bx + c, logarithmisch y = a + b · ln x.

1) (–1 | 16), (0 | 9), (1 | 8) : $y = ax^2 + bx + c$, $a; b; c = ?$ _____

2) (1 | 24), (2 | 36), (3 | 54), (4 | 81) : $y = a \cdot b^x$, $a; b = ?$ _____

3) (1 | –3), (2 | –2), (3 | –3) : $y = ax^2 + bx + c$, $a; b; c = ?$ _____

4) (1 | 20), (e | 25), (e^2 | 30) : $y = a + b \cdot \ln x$, $a; b = ?$ _____

5) (2 | 4), (3 | 2), (4 | 1), (5 | 0,5) : $y = a \cdot b^x$, $a; b = ?$ _____

6) (–1 | 10), (0 | 3), (1 | 0) : $y = ax^2 + bx + c$, $a; b; c = ?$ _____

7) (0 | 9), (1 | 6), (2 | 1) : $y = ax^2 + bx + c$, $a; b; c = ?$ _____

8) (1 | 7), (e | 1), (e^2 | –5) : $y = a + b \cdot \ln x$, $a; b = ?$ _____

9) (0 | –3), (1 | –2), (2 | –5) : $y = ax^2 + bx + c$, $a; b; c = ?$ _____

10) (1 | 8), (2 | 4), (3 | 2), (4 | 1) : $y = a \cdot b^x$, $a; b = ?$ _____

11) (0 | 0), (2 | 4), (4 | 32) : $y = ax^2 + bx + c$, $a; b; c = ?$ _____

12) (2 | 45), (3 | 135), (4 | 405), (5 | 1215) : $y = a \cdot b^x$, $a; b = ?$ _____

13) (1 | –11), (2 | –19), (3 | –29) : $y = ax^2 + bx + c$, $a; b; c = ?$ _____

14) (1 | 32), (2 | 16), (3 | 8), (4 | 4) : $y = a \cdot b^x$, $a; b = ?$ _____

15) (–1 | 4), (0 | 9), (1 | 16) : $y = ax^2 + bx + c$, $a; b; c = ?$ _____

16) (0 | 8), (1 | 12), (2 | 18), (3 | 27) : $y = a \cdot b^x$, $a; b = ?$ _____

17) (1 | 6), (2 | 9), (3 | 13,5), (4 | 20,25) : $y = a \cdot b^x$, $a; b = ?$ _____

Lösungen: Regression: quadratisch, exponentiell, logarithmisch

Stufe 2: Parameter aus exakten Daten

1) $y = 3x^2 - 4x + 9$

2) $b = \frac{36}{24} = 1{,}5,\quad a = 16:\quad y = 16 \cdot 1{,}5^x\quad (R^2 = 1)$

3) $y = -1x^2 + 4x - 6$

4) $a = y(1) = 20,\quad b = 25 - 20 = 5:\quad y = 20 + 5\ln x$

5) $b = \frac{2}{4} = 0{,}5,\quad a = 16:\quad y = 16 \cdot 0{,}5^x\quad (R^2 = 1)$

6) $y = 2x^2 - 5x + 3$

7) $y = -1x^2 - 2x + 9$

8) $a = y(1) = 7,\quad b = 1 - 7 = -6:\quad y = 7 - 6\ln x$

9) $y = -2x^2 + 3x - 3$

10) $b = \frac{4}{8} = 0{,}5,\quad a = 16:\quad y = 16 \cdot 0{,}5^x\quad (R^2 = 1)$

11) $y = 3x^2 - 4x + 0$

12) $b = \frac{135}{45} = 3,\quad a = 5:\quad y = 5 \cdot 3^x\quad (R^2 = 1)$

13) $y = -1x^2 - 5x - 5$

14) $b = \frac{16}{32} = 0{,}5,\quad a = 64:\quad y = 64 \cdot 0{,}5^x\quad (R^2 = 1)$

15) $y = 1x^2 + 6x + 9$

16) $b = \frac{12}{8} = 1{,}5,\quad a = 8:\quad y = 8 \cdot 1{,}5^x\quad (R^2 = 1)$

17) $b = \frac{9}{6} = 1{,}5,\quad a = 4:\quad y = 4 \cdot 1{,}5^x\quad (R^2 = 1)$