

Aufgabe 6

$$f(x) = c \cdot a^x \quad c > 0, \quad a > 0, \quad a \neq 1$$

a)

$$P(0 | 2) \quad Q(1 | 6)$$

$$2 = c \cdot a^0$$

$$2 = c$$

$$6 = c \cdot a^1$$

$$6 = 2 \cdot a \quad | : 2$$

$$3 = a$$

$$f(x) = 2 \cdot 3^x$$

b)

$$P(2 \mid 6,8) \quad Q(5 \mid 9,3)$$

$$6,8 = c \cdot a^2 \quad | : a^2$$

$$\frac{6,8}{a^2} = c$$

$$9,3 = c \cdot a^5$$

$$9,3 = \frac{6,8}{a^2} \cdot a^5$$

$$9,3 = 6,8a^3$$

$$1,37 = a^3 \quad | \sqrt[3]{\quad}$$

$$1,11 = a$$

$$c = \frac{6,8}{1,11^2} = 5,52$$

$$f(x) = 5,52 \cdot 1,11^x$$

c)

$$P(4 | 30) \quad Q(12 | 5)$$

$$30 = c \cdot a^4 \quad | : a^4$$
$$\frac{30}{a^4} = c$$

$$5 = c \cdot a^{12}$$

$$5 = \frac{30}{a^4} \cdot a^{12}$$

$$5 = 30a^8 \quad | : 30$$

$$0,17 = a^8 \quad | \sqrt[8]{}$$

$$0,8 = a$$

$$c = \frac{30}{0,8^4} = 73,24$$

$$f(x) = 73,24 \cdot 0,8^x$$

d)

$$P(8 \mid 4,3) \quad Q(10 \mid 4,3)$$

$$4,3 = c \cdot a^8 \quad | : a^8$$

$$\frac{4,3}{a^8} = c$$

$$4,3 = c \cdot a^{10}$$

$$4,3 = \frac{4,3}{a^8} \cdot a^{10}$$

$$4,3 = \frac{4,3^2}{a} \quad | : 4,3$$

$$1 = a$$

$$c = \frac{4,3}{1^8} = 4,3$$

$$f(x) = 4,3 \cdot 1^x = 4,3$$

Dies ist keine Exponentialfunktion sondern eine konstante (waagerechte) Gerade!

e)

$$P(0 | 5) \quad Q(10 | 1)$$

$$5 = c \cdot a^0$$

$$5 = c$$

$$1 = c \cdot a^{10}$$

$$1 = 5 \cdot a^{10}$$

$$| : 5$$

$$0,2 = a^{10}$$

$$| \sqrt[10]{}$$

$$a = 0,85$$

$$f(x) = 5 \cdot 0,85^x$$

f)

$$P(-2 | 0,1) \quad Q(6 | 2)$$

$$0,1 = c \cdot a^{-2} \quad | : a^{-2}$$
$$\frac{0,1}{a^{-2}} = c$$

$$2 = c \cdot a^6$$

$$2 = \frac{0,1}{a^{-2}} \cdot a^6$$

$$2 = 0,1a^8 \quad | : 0,1$$

$$20 = a^8 \quad | \sqrt[8]{\quad}$$

$$1,45 = a$$

$$c = \frac{0,1}{1,45^{-2}} = 0,21$$

$$f(x) = 0,21 \cdot 1,45^x$$

g)

$$P(5 \mid 100) \quad Q(7 \mid 10.000)$$

$$100 = c \cdot a^5 \quad | : a^5$$
$$\frac{100}{a^5} = c$$

$$10.000 = c \cdot a^7$$

$$10.000 = \frac{100}{a^5} \cdot a^7$$

$$10.000 = 100a^2 \quad | : 100$$

$$100 = a^2 \quad | \sqrt{\quad}$$

$$10 = a$$

$$c = \frac{100}{10^5} = 0,001$$

$$f(x) = 0,001 \cdot 10^x$$

h)

$$P(-3 \mid 2000) \quad Q(-1 \mid 400)$$

$$2000 = c \cdot a^{-3} \quad | : a^{-3}$$
$$\frac{2000}{a^{-3}} = c$$

$$400 = c \cdot a^{-1}$$

$$400 = \frac{2000}{a^{-3}} \cdot a^{-1}$$

$$400 = 2000a^2 \quad | : 2000$$

$$0,2 = a^2 \quad | \sqrt{\quad}$$

$$0,45 = a$$

$$c = \frac{2000}{0,45^{-3}} = 182,25$$

$$f(x) = 182,25 \cdot 0,45^x$$

i)

$$P(0 | 0) \quad Q(1 | 4)$$

$$0 = c \cdot a^0$$

$$0 = c$$

$$4 = c \cdot a^1$$

$$4 = 0 \cdot a^1$$

$$4 \neq 0$$