

Arbeitsblatt Quotientenregel

Aufgaben:

$$f(x) = \frac{1-x^2}{x-2}$$

$$f(x) = \frac{(1-x)^2}{2-x}$$

$$f(x) = \frac{x^2}{x-1}$$

$$f(x) = \frac{x^2-4}{x^2+2}$$

$$f(x) = \frac{x^3}{x^2+6}$$

$$f(x) = \frac{x^2+2x-5}{2(x+1)}$$

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

$$f(x) = \frac{x^2}{(x-2)^2}$$

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Aufgaben mit Lösungen

$$f(x) = \frac{1-x^2}{x-2}$$

$$\begin{aligned} f'(x) &= \frac{(-2x)(x-2) - (1-x^2)(1)}{(x-2)^2} \\ &= \frac{-2x^2 + 4x - 1 + x^2}{(x-2)^2} \\ &= \frac{-x^2 + 4x - 1}{(x-2)^2} \end{aligned}$$

$$f(x) = \frac{(1-x)^2}{2-x}$$

$$f'(x) = \frac{((1-x)^2)'(2-x) - (1-x)^2(2-x)'}{(2-x)^2}$$

$$f'(x) = \frac{(2)(1-x)(-1)(2-x) - (1-x^2)(-1)}{(2-x)^2}$$

$$f'(x) = \frac{-3 + 6x - 3x^2}{(2-x)^2}$$

$$f(x) = \frac{x^2}{x-1}$$

$$f'(x) = \frac{(x^2)'(x-1) - (x^2)(x-1)'}{(x-1)^2}$$

$$f'(x) = \frac{(x^2)'(x-1) - (x^2)(x-1)'}{(x-1)^2}$$

$$f'(x) = \frac{(2x)(x-1) - (x^2)(1)}{(x-1)^2}$$

$$f'(x) = \frac{(2x^2 - 2x) - (x^2)}{(x-1)^2}$$

$$f'(x) = \frac{x^2 - 2x}{(x-1)^2}$$

$$f(x) = \frac{x^2 - 4}{x^2 + 2}$$

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

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

$$f'(x) = \frac{(2x^3 + 4x) - (2x^3 - 8x)}{(x^2 + 2)^2}$$

$$f'(x) = \frac{2x^3 + 4x - 2x^3 + 8x}{(x^2 + 2)^2}$$

$$f'(x) = \frac{12x}{(x^2 + 2)^2}$$

$$f(x) = \frac{x^3}{x^2 + 6}$$

$$\begin{aligned} f'(x) &= \frac{(x^3)'(x^2 + 6) - (x^3)(x^2 + 6)'}{(x^2 + 6)^2} \\ &= \frac{(3x^2)(x^2 + 6) - (x^3)(2x)}{(x^2 + 6)^2} \\ &= \frac{(3x^4 + 18x^2) - (2x^4)}{(x^2 + 6)^2} \\ &= \frac{x^4 + 18x^2}{(x^2 + 6)^2} \end{aligned}$$

$$\begin{aligned}
 f(x) &= \frac{x^2 + 2x - 5}{2(x+1)} = \frac{x^2 + 2x - 5}{2x+2} \\
 f'(x) &= \frac{(2x+2)(2x+2) - (x^2 + 2x - 5)(2)}{(2x+2)^2} \\
 &= \frac{(2x+2)(2x+2) - (2x^2 + 4x - 10)}{(2x+2)(2x+2)} \\
 &= \frac{(2x+2)^2 - (2x^2 + 4x - 10)}{(2x+2)^2}
 \end{aligned}$$

$$= \frac{(2x+2)^2 - 2x^2 - 4x + 10}{(2x+2)^2} = \frac{4x^2 + 8x + 4 - 2x^2 - 4x + 10}{(2x+2)^2} = \frac{2x^2 + 4x + 14}{(2x+2)^2}$$

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

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

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

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

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

$$f(x) = \frac{x^2}{(x-2)^2}$$

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

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

$$f'(x) = \frac{2x^3-8x^2+8x-2x^3+4x^2}{(x-2)^4}$$

$$f'(x) = \frac{-4x^2+8x}{(x-2)^4}$$