

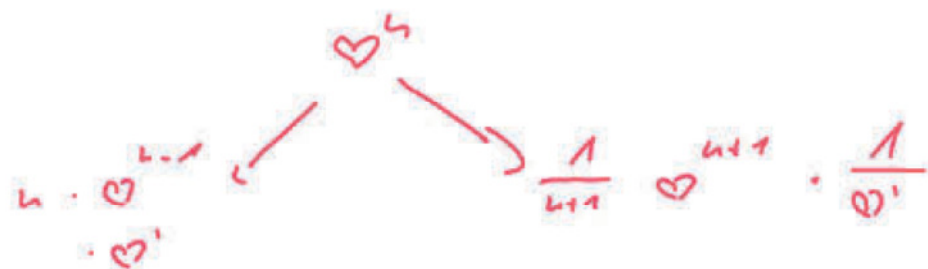
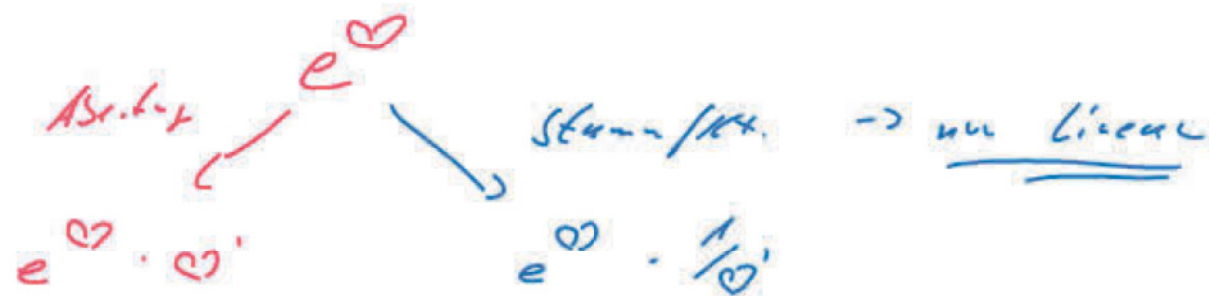
$$1) f(x) = 7x - 2e^{3x-5}$$

$$2) f(x) = -3 \cdot \sin(2-3x)$$

$$3) f(x) = \sqrt{5x-6} \quad \wedge \quad g(x) = x$$

$$1) F(x) = \frac{7}{2} \cdot x^2 - 2 \cdot e^{3x-5} \cdot \frac{1}{3} \cdot \frac{7}{2} x^2 - \frac{2}{3} e^{3x-5}$$

$$2) G(x) = -3 \cdot (-\cos(2-3x)) \cdot \left(-\frac{1}{3}\right) = -\cos(2-3x)$$



$$f(x) = \frac{1}{3} \sqrt[3]{5-2x} = \underline{\underline{(5-2x)^{1/3}}}$$

$$F(x) = \frac{3/4}{-2} (5-2x)^{4/3} = -\frac{3}{8} \sqrt[3]{(5-2x)^4}$$

$$G(x) = (5-2x)^{4/3} \rightarrow G'(x) = \frac{4}{3} \cdot (5-2x)^{1/3} \cdot (-2) = -\frac{8}{3} \cdot \underline{(5-2x)^{1/3}}$$

$$F(x) = -\frac{3}{8} \cdot (5-2x)^{4/3}$$

$$f(x) = \sqrt{5x-6} \quad \wedge \quad g(x) = x \quad f'(x) = g'(x)$$

$$\sqrt{5x-6} = x \quad | \uparrow^2$$

$$5x-6 = x^2 \quad | -5x+6 \quad \text{Nullf. -}$$

$$x^2 - 5x + 6 = 0$$

$$(x-3)(x-2) = 0 \quad x_1 = 2 \quad \vee \quad x_2 = 3$$

$$d(x) = f(x) - g(x) = \sqrt{5x-6} - x = (5x-6)^{1/2} - x$$

$$\int_2^3 d(x) dx = D(3) - D(2) = -\frac{9}{10} + \frac{14}{15} = \frac{-27+28}{30} = \frac{1}{30} \approx 0,033$$

$$\frac{18}{5} - \frac{9}{2} = 0,9$$

$$D(x) = \frac{1}{\frac{3}{2}} (5x-6)^{3/2} \cdot \frac{1}{5} - \frac{1}{2} x^2$$

$$= \frac{2}{15} \cdot \sqrt{(5x-6)^3} - \frac{1}{2} x^2$$

$$\rightarrow D(3) = \frac{2}{15} \cdot 27 - \frac{9}{2}$$

$$\rightarrow D(2) = \frac{2}{15} \cdot 8 - 2$$

$$= -\frac{14}{15}$$

Partielle Integration

Produkt
mit abnehmender

$$[u \cdot v]' = u' \cdot v + v' \cdot u \quad | \int$$

$$\int [u \cdot v]' = \int u' \cdot v + \int v' \cdot u$$

$$u \cdot v = \int u' \cdot v + \int v' \cdot u \quad | - \int v' \cdot u$$

$$\int u' \cdot v = u \cdot v - \int v' \cdot u$$

$$\int x \cdot e^x \quad \nearrow \quad \frac{1}{2}x^2 \rightarrow x^3 \rightarrow x^4 \rightarrow x^i$$

$$\int u' \cdot v = u \cdot v - \int u \cdot v'$$

$$\int 2x \cdot \cos(2x) dx$$

↓ *reduzierende*

$$v = 2x \quad \rightarrow \quad v' = 2$$

$$u' = \cos(2x) \quad \rightarrow \quad u = \frac{1}{2} \sin(2x)$$

$$2x \cdot \frac{1}{2} \sin(2x) - \int 2 \cdot \frac{1}{2} \sin(2x) dx$$

$$x \cdot \sin(2x) - \int \sin(2x) dx$$

$$x \cdot \sin(2x) - \left[-\frac{1}{2} \cos(2x) \right] = x \sin(2x) + \frac{1}{2} \cos(2x)$$

$$\int u \cdot v' = u \cdot v - \int u' \cdot v$$

$$\int \left(\frac{1}{2}x^2 \cdot e^{4-x} \right) dx$$

$$u = \frac{1}{2}x^2 \quad \rightarrow \quad u' = x$$

$$v' = e^{4-x} \quad \rightarrow \quad v = -e^{4-x}$$

$$\Rightarrow -\frac{1}{2}x^2 e^{4-x} - \int x \cdot (-e^{4-x}) dx$$

$$-\frac{1}{2}x^2 e^{4-x} + \int x \cdot e^{4-x} dx$$

$$u = x \quad \rightarrow \quad u' = 1$$

$$v' = e^{4-x} \quad \rightarrow \quad v = -e^{4-x}$$

$$\rightarrow -x e^{4-x} - \int 1 \cdot (-e^{4-x}) = -x e^{4-x} + \int e^{4-x} dx$$

$$\Rightarrow -\frac{1}{2}x^2 e^{4-x} - x \cdot e^{4-x} - e^{4-x} + C$$

$$\int e^{1-2x} \cdot \sin(2x) dx$$

$$u = e^{1-2x} \rightarrow u' = -2e^{1-2x}$$

$$v' = \sin(2x) \rightarrow v = -\frac{1}{2} \cos(2x)$$

$$-\frac{1}{2} e^{1-2x} \cdot \cos(2x) - \int (-2e^{1-2x}) \cdot \left(-\frac{1}{2} \cos(2x)\right) dx$$

$$\int e^{1-2x} \cdot \cos(2x) dx$$

$$u = e^{1-2x} \rightarrow u' = -2e^{1-2x}$$

$$v' = \cos(2x) \rightarrow v = \frac{1}{2} \sin(2x)$$

$$\frac{1}{2} e^{1-2x} \cdot \sin(2x) - \int (-2e^{1-2x}) \cdot \left(\frac{1}{2} \sin(2x)\right) dx$$

$$+ \int e^{1-2x} \cdot \sin(2x) dx$$

$$\underline{\int e^{1-2x} \cdot \sin(2x) dx =}$$

$$-\frac{1}{2}e^{1-2x} \cdot \cos(2x) - \left[\frac{1}{2}e^{1-2x} \cdot \sin(2x) + \int e^{1-2x} \cdot \sin(2x) dx \right]$$

$$-\frac{1}{2}e^{1-2x} \cdot \cos(2x) - \frac{1}{2}e^{1-2x} \cdot \sin(2x) - \underline{\int e^{1-2x} \cdot \sin(2x) dx}$$
$$+ \int e^{1-2x} \cdot \sin(2x) dx$$

$$2 \cdot \int e^{1-2x} \cdot \sin(2x) dx = -\frac{1}{2}e^{1-2x} (\cos(2x) + \sin(2x)) \quad | \cdot \frac{1}{2}$$

$$\int e^{1-2x} \sin(2x) dx = -\frac{1}{4}e^{1-2x} [\cos(2x) + \sin(2x)] + C$$