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

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

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

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

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

$e^{\heartsuit}$

Ableitung $\swarrow$ $\searrow$ Stammfkt. $\rightarrow$ nur Linear

$e^{\heartsuit} \cdot \heartsuit'$ $\qquad$ $e^{\heartsuit} \cdot \frac{1}{\heartsuit'}$

$\heartsuit^{n}$

$\swarrow$ $\searrow$

$n \cdot \heartsuit^{n-1} \cdot \heartsuit'$ $\qquad$ $\frac{1}{n+1} \heartsuit^{n+1} \cdot \frac{1}{\heartsuit'}$

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

$$F(x) = 3/4\,(5-2x)^{4/3} \cdot \frac{1}{-2} = -3/8 \cdot \sqrt[3]{(5-2x)^4}$$

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

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

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

$\sqrt{5x-6} = x \qquad |\ (\ )^2$

$5x - 6 = x^2 \qquad | - 5x + 6 \qquad$ Nullfo. –

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

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

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

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

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

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

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

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

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

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

Partielle Integration

$\leftarrow$ Produkt
$\leftarrow$ mind. alternierende

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

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

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

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

$$\int x \cdot e^x$$

$$\tfrac{1}{2} x^2 \to x^3 \to x^4 \to x^5$$

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

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

reduzierende

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

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

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

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

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

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

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

$$u = \tfrac{1}{2}x^2 \quad \rightarrow \quad u' = x$$
$$v' = e^{4-x} \quad \rightarrow \quad v = -e^{4-x}$$

$$\Rightarrow -\tfrac{1}{2}x^2 e^{4-x} - \int x \cdot (-e^{4-x})\, dx$$
$$\underline{-\tfrac{1}{2}x^2 e^{4-x}} + \int x \cdot e^{4-x}\, dx$$

$$u = x \quad \rightarrow \quad u' = 1$$
$$v' = e^{4-x} \quad \rightarrow \quad v = -e^{4-x}$$

$$\underline{-e^{4-x}}$$

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

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

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

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

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

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

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

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

$$v' = \cos(2x) \rightarrow v = 1/2 \cdot \sin(2x)$$

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

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

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

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

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

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

$$2 \cdot \int e^{1-2x} \cdot \sin(2x)\, dx = -\tfrac{1}{2} e^{1-2x} \left(\cos(2x) + \sin(2x) \right) \quad \Big| \cdot \tfrac{1}{2}$$

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