

Nr. 1) a) $f(x) = x^2$ $F(x) = \frac{x^3}{3} + C$

b) $f(x) = x^3$ $F(x) = \frac{x^4}{4} + C$

c) $f(x) = 3x$ $F(x) = \frac{3x^2}{2} + C = \frac{3}{2}x^2 + C$

d) $f(x) = x^5$ $F(x) = \frac{x^6}{6} + C$

e) $f(x) = 5x^2$ $F(x) = 5 \cdot \frac{x^3}{3} + C = \frac{5}{3}x^3 + C$

f) $f(x) = x^4$ $F(x) = \frac{x^5}{5} + C$

g) $f(x) = 0,1x^3$ $F(x) = 0,1 \cdot \frac{x^4}{4} + C = \frac{1}{40}x^4 + C$

h) $f(x) = x$ $F(x) = \frac{x^2}{2} + C$

i) $f(x) = 2$ $F(x) = 2x + C$

j) $f(x) = 2x^5$ $F(x) = 2 \cdot \frac{x^6}{6} + C = \frac{1}{3}x^6 + C$

Nr. 2) a) $f(x) = 4x^3 + 3x^4$ $F(x) = 4 \cdot \frac{x^4}{4} + 3 \cdot \frac{x^5}{5} = x^4 + \frac{3}{5}x^5$

b) $f(x) = \frac{1}{10}x^4 - \frac{10}{x^4} = \frac{1}{10}x^4 - 10 \cdot x^{-4}$ $F(x) = \frac{1}{10} \cdot \frac{x^5}{5} - 10 \cdot \frac{x^{-3}}{-3}$

$F(x) = \frac{1}{50}x^5 + \frac{10}{3}x^{-3} = \frac{1}{50}x^5 + \frac{10}{3x^3}$

c) $f(x) = 3 \cdot \cos(x) - x$ $F(x) = 3 \cdot \sin(x) - \frac{x^2}{2}$

d) $f(x) = \frac{1}{2x^2} + \frac{\sin(x)}{4} = \frac{1}{2} \cdot x^{-2} + \frac{\sin(x)}{4}$

$F(x) = \frac{1}{2} \cdot \frac{x^{-1}}{-1} + \frac{-\cos(x)}{4} = -\frac{1}{2x} - \frac{1}{4} \cos(x)$

$$\text{Nr. 2) e) } f(x) = 2 \cdot e^x + 1 \quad F(x) = 2 \cdot e^x + x$$

$$f) f(x) = \frac{1}{3} e^x - \frac{x^2}{2} \quad F(x) = \frac{1}{3} e^x - \frac{x^3}{6}$$

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

$$F(x) = -\cos(x) - 2 \cdot \ln(|x|)$$

$$h) f(x) = \frac{1}{2x} - \frac{3}{2x^2} = \frac{1}{2} \cdot x^{-1} - \frac{3}{2} x^{-2}$$

$$F(x) = \frac{1}{2} \cdot \ln(|x|) - \frac{3}{2} \cdot \frac{x^{-1}}{-1} = \frac{1}{2} \ln(|x|) + \frac{3}{2x}$$

$$\text{Nr. 3) a) } f(x) = (3x-1)^2 \quad F(x) = \frac{1}{3} (3x-1)^3 \cdot \frac{1}{3} = \frac{1}{9} (3x-1)^3$$

$$b) f(x) = \frac{3}{(1-5x)^4} = 3 \cdot (1-5x)^{-4}$$

$$F(x) = \frac{3}{-3} (1-5x)^{-3} \cdot \left(-\frac{1}{5}\right) = \frac{1}{5} \cdot (1-5x)^{-3} = \frac{1}{5 \cdot (1-5x)^3}$$

$$c) f(x) = 2 \sin(\pi x) \quad F(x) = 2 \cdot (-\cos(\pi x)) \cdot \frac{1}{\pi}$$

$$F(x) = -\frac{2}{\pi} \cdot (\cos(\pi x))$$

$$d) f(x) = \cos(1-3x) \quad F(x) = \sin(1-3x) \left(-\frac{1}{3}\right) = -\frac{1}{3} \sin(1-3x)$$

$$e) f(x) = e^{4x-1} \quad F(x) = e^{4x-1} \cdot \frac{1}{4} = \frac{1}{4} \cdot e^{4x-1}$$

$$f) f(x) = \frac{2}{5} \cdot e^{2-5x} \quad F(x) = \frac{2}{5} \cdot e^{2-5x} \cdot \left(-\frac{1}{5}\right) = -\frac{2}{25} \cdot e^{2-5x}$$

$$g) f(x) = \frac{2}{3} \cdot (5-4x)^4 \quad F(x) = \frac{2}{3} \cdot \frac{(5-4x)^5}{5} \cdot \left(-\frac{1}{4}\right) = -\frac{1}{30} \cdot (5-4x)^5$$

Nr. 3) h) $f(x) = \frac{5}{2 \cdot (1-x)^2} = \frac{5}{2} \cdot (1-x)^{-2}$

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

i) $f(x) = \sqrt{6x} = (6x)^{\frac{1}{2}}$ $F(x) = \frac{(6x)^{\frac{3}{2}}}{\frac{3}{2}} \cdot \frac{1}{6} = \frac{2}{3} \cdot \frac{1}{6} \cdot (6x)^{\frac{3}{2}}$

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

j) $f(x) = \sqrt{9 - \frac{1}{3}x} = \left(9 - \frac{1}{3}x\right)^{\frac{1}{2}}$; $F(x) = \frac{\left(9 - \frac{1}{3}x\right)^{\frac{3}{2}}}{\frac{3}{2}} \cdot \left(\frac{1}{-\frac{1}{3}}\right)$

$F(x) = \frac{-2 \cdot 3}{3} \cdot \left(9 - \frac{1}{3}x\right)^{\frac{3}{2}} = -2 \cdot \sqrt{9 - \frac{1}{3}x}^3$

k) $f(x) = \frac{1}{3+x} = (3+x)^{-1}$ $F(x) = \ln(|3+x|)$

l) $f(x) = \frac{7}{3x+1} = 7 \cdot (3x+1)^{-1}$

$F(x) = 7 \cdot \ln(|3x+1|) \cdot \frac{1}{3} = \frac{7}{3} \cdot \ln(|3x+1|)$