

## Lösungen formales Integrieren I

### Ausführliche Lösungen:

A1	Ausführliche Lösung
a)	$f(x) = x \Rightarrow F(x) = \int f(x) dx = \int x dx = \int x^1 dx = \frac{1}{1+1} x^{1+1} + C = \underline{\underline{\frac{1}{2} x^2 + C}}$ <p>Probe: <math>F'(x) = \frac{2}{2} x = x = f(x)</math></p>
A1	Ausführliche Lösung
b)	$f(x) = x^2 \Rightarrow F(x) = \int f(x) dx = \int x^2 dx = \underline{\underline{\frac{1}{3} x^3 + C}}$ <p>Probe: <math>F'(x) = \frac{3}{3} x^2 = x^2 = f(x)</math></p>
A1	Ausführliche Lösung
c)	$f(x) = x^3 \Rightarrow F(x) = \int f(x) dx = \int x^3 dx = \underline{\underline{\frac{1}{4} x^4 + C}}$ <p>Probe: <math>F'(x) = \frac{4}{4} x^3 = x^3 = f(x)</math></p>
A1	Ausführliche Lösung
d)	$f(x) = x^6 \Rightarrow F(x) = \int f(x) dx = \int x^6 dx = \underline{\underline{\frac{1}{7} x^7 + C}}$ <p>Probe: <math>F'(x) = \frac{7}{7} x^6 = x^6 = f(x)</math></p>
A1	Ausführliche Lösung
e)	$f(x) = 3x^2 \Rightarrow F(x) = \int f(x) dx = \int 3x^2 dx = \frac{3}{3} x^3 + C = \underline{\underline{x^3 + C}}$ <p>Probe: <math>F'(x) = 3x^2 = f(x)</math></p>
A1	Ausführliche Lösung
f)	$f(x) = 4x \Rightarrow F(x) = \int f(x) dx = \int 4x dx = \frac{4}{2} x^2 + C = \underline{\underline{2x^2 + C}}$ <p>Probe: <math>F'(x) = 4x = f(x)</math></p>
A1	Ausführliche Lösung
g)	$f(x) = a \Rightarrow F(x) = \int f(x) dx = \int a dx = \underline{\underline{ax + C}}$ <p>Probe: <math>F'(x) = a = f(x)</math></p>

A1	Ausführliche Lösung
	h) $f(x) = 1 \Rightarrow F(x) = \int f(x)dx = \int dx = \underline{\underline{x + C}}$ Probe: $F'(x) = 1 = f(x)$
A2	Ausführliche Lösung
	a) $f(x) = -5 \Rightarrow F(x) = \int f(x)dx = \int -5 dx = \underline{\underline{-5x + C}}$ Probe: $F'(x) = -5 = f(x)$
A2	Ausführliche Lösung
	b) $f(x) = 5x^4 \Rightarrow F(x) = \int f(x)dx = \int 5x^4 dx = \frac{5}{5}x^5 + C = \underline{\underline{x^5 + C}}$ Probe: $F'(x) = 5x^4 = f(x)$
A2	Ausführliche Lösung
	c) $f(x) = -\frac{1}{5}x^8 \Rightarrow F(x) = \int f(x)dx = \int -\frac{1}{5}x^8 dx = -\frac{1}{5 \cdot 9}x^9 + C = \underline{\underline{-\frac{1}{45}x^9 + C}}$ Probe: $F'(x) = -\frac{9}{45}x^8 = -\frac{1}{5}x^8 = f(x)$
A2	Ausführliche Lösung
	d) $f(x) = 2x^7 \Rightarrow F(x) = \int f(x)dx = \int 2x^7 dx = \frac{2}{8}x^8 + C = \underline{\underline{\frac{1}{4}x^8 + C}}$ Probe: $F'(x) = \frac{8}{4}x^7 = 2x^7 = f(x)$
A2	Ausführliche Lösung
	e) $f(x) = \frac{1}{2}x^3 + 2x + 4 \Rightarrow F(x) = \int f(x)dx = \int \left( \frac{1}{2}x^3 + 2x + 4 \right) dx$ $= \frac{1}{2 \cdot 4}x^4 + \frac{2}{2}x^2 + 4x + C = \underline{\underline{\frac{1}{8}x^4 + x^2 + 4x + C}}$ Probe: $F'(x) = \frac{4}{8}x^3 + 2x + 4 = \frac{1}{2}x^3 + 2x + 4 = f(x)$
A3	Ausführliche Lösung
	a) $f(x) = 4 - x \Rightarrow F(x) = \int f(x)dx = \int (4 - x) dx = 4x - \frac{1}{2}x^2 + C$ Probe: $F'(x) = 4 - \frac{2}{2}x = 4 - x = f(x)$

A3	<p><b>Ausführliche Lösung</b></p> <p>b) <math>f(x) = ax + b \Rightarrow F(x) = \int f(x)dx = \int (ax + b) dx = \underline{\underline{\frac{a}{2}x^2 + bx + C}}</math></p> <p>Probe: <math>F'(x) = \frac{2a}{2}x + b = ax + b = f(x)</math></p>
A3	<p><b>Ausführliche Lösung</b></p> <p>c) <math>f(x) = ax^2 + bx + c \Rightarrow F(x) = \int f(x)dx = \int (ax^2 + bx + c) dx = \underline{\underline{\frac{a}{3}x^3 + \frac{b}{2}x^2 + cx + C}}</math></p> <p>Probe: <math>F'(x) = \frac{3a}{3}x^2 + \frac{2b}{2}x + c = ax^2 + bx + c = f(x)</math></p>
A3	<p><b>Ausführliche Lösung</b></p> <p>d) <math>f(x) = 2x^3 - \frac{2}{3}x^2 + \frac{4}{5}x - \frac{3}{2} \Rightarrow F(x) = \int f(x)dx = \int \left( 2x^3 - \frac{2}{3}x^2 + \frac{4}{5}x - \frac{3}{2} \right) dx</math></p> <p><math>= \frac{2}{4}x^4 - \frac{2}{3 \cdot 3}x^3 + \frac{4}{5 \cdot 2}x^2 - \frac{3}{2}x + C = \underline{\underline{\frac{1}{2}x^4 - \frac{2}{9}x^3 + \frac{2}{5}x^2 - \frac{3}{2}x + C}}</math></p> <p>Probe: <math>F'(x) = \frac{4}{2}x^3 - \frac{2 \cdot 3}{9}x^2 + \frac{2 \cdot 2}{5}x - \frac{3}{2} = 2x^3 - \frac{2}{3}x^2 + \frac{4}{5}x - \frac{3}{2} = f(x)</math></p>
A3	<p><b>Ausführliche Lösung</b></p> <p>e) <math>f(x) = 4 - 3x + \frac{5}{2}x^2 \Rightarrow F(x) = \int f(x)dx = \int \left( 4 - 3x + \frac{5}{2}x^2 \right) dx</math></p> <p><math>= 4x - \frac{3}{2}x^2 + \frac{5}{2 \cdot 3}x^3 + C = \underline{\underline{4x - \frac{3}{2}x^2 + \frac{5}{6}x^3 + C}}</math></p> <p>Probe: <math>F'(x) = 4 - \frac{3 \cdot 2}{2}x + \frac{5 \cdot 3}{6}x^2 = 4 - 3x + \frac{5}{2}x^2 = f(x)</math></p>