

Integral berechnen

Aufgabenstellung:

Berechnen Sie $\int (ah^3 + a^2)dh$!

Quelle: BMB, Aufgabenpool SRP M, Nr. 1_167, offene Typ-1-Aufgabe, Grundkompetenz AN 4.2,
aufgabenpool.srdp.at/srp_ahs/download.php?file=Integral_berechnen.pdf

Integral berechnen

The screenshot shows the 'Edit Aktion Interaktiv' window of a Casio calculator. The input field contains the expression ah^3+a^2 , which is highlighted in blue. A red box highlights the 'Var' key on the keyboard overlay. The keyboard overlay is labeled 'Keyboard' and includes a grid of letters (a-z), a 'CAPS' key, and navigation keys. The calculator's mode is set to 'Algeb'.

Math1	a	b	c	d	e	f
Math2	g	h	i	j	k	l
Math3	m	n	o	p	q	r
Trig	s	t	u	v	w	x
Var	y	z	()	,	⇒	CAPS
abc	←	↶	↷	Ans	EXE	

Integrand markieren

Tipp: Stift von rechts nach links ziehen

Integral berechnen

The screenshot shows the 'Edit Aktion' menu with 'Interaktiv' selected. The expression $ah^3 + a^2$ is entered in the top field. The 'Integral' option is highlighted in the menu. The calculator interface includes a keypad with variables a through x , a numeric keypad, and a status bar at the bottom showing 'Algeb', 'Standard', 'Reell', and '2π'.

The screenshot shows the 'Integral' dialog box. The 'Unbestimmt. Integral' radio button is selected. The 'Ausdruck:' field contains $ah^3 + a^2$ and the 'Variable:' field contains h . The 'OK' and 'Abbrechen' buttons are visible. The calculator keypad is shown at the bottom.

Integrand → Ausdruck: $ah^3 + a^2$
Integrationsvariable → Variable: h

Integral berechnen

The screenshot shows the CASIO ClassPad II calculator interface. At the top left is a red button with the square root symbol $\sqrt{\alpha}$. The main window is titled "Edit Aktion Interaktiv" and contains a toolbar with icons for numerical constants (0.5, 1/2), a hand cursor, integration (∫dx), simplification (Simp), differentiation (fdx), and graphing (graph icon). The main display area shows the integral $\int a \cdot h^3 + a^2 dh$ and the result $\frac{a \cdot h^4}{4} + a^2 \cdot h$. A vertical scrollbar is on the right side of the display. At the bottom, there are mode selection buttons: "Algeb", "Standard", "Reell", and "2π".

ClassPad gibt *eine* Stammfunktion aus ohne Integrationskonstante C

Lösung:

$$\frac{ah^4}{4} + a^2h + C \quad (\text{mit } C \in \mathbb{R})$$

Integral berechnen (Alternative 1)

√a

Edit Aktion Interaktiv

$\int ah^3 + a^2 dh$

Math1	Line	$\frac{\square}{\square}$	$\sqrt{\square}$	π	\Rightarrow
Math2	\square^\square	e^\square	ln	i	∞
Math3	$ \square $	$\frac{d}{d\square}$	$\frac{d^\square}{d\square}$	$\int \square$	lim
Trig	$[\square]$	$[\square]$	$[\square]$	Σ	\prod
Var	sin	cos	tan	θ	t
abc					
	\leftarrow	\leftarrow	\leftarrow	Ans	EXE

Algeb Standard Reell 2π

Hinweis: Wechsel von Integrand zu Integrationsvariable mit

Math1	a	b	c	d	e	f
Math2	g	h	i	j	k	l
Math3	m	n	o	p	q	r
Trig	s	t	u	v	w	x
Var	y	z	()	,	\Rightarrow	CAPS
abc						
	\leftarrow	\leftarrow	\leftarrow	Ans	EXE	

Integral berechnen (Alternative 1)

0.5 1/2 $\int dx$ $\int dx$ Simp $\int dx$ $\int dx$

$\int ah^3 + a^2 dh$

$\frac{a \cdot h^4}{4} + a^2 \cdot h$

Algeb Standard Reell 2π

ClassPad gibt *eine* Stammfunktion aus ohne Integrationskonstante

Lösung:

$$\frac{ah^4}{4} + a^2h + C \text{ (mit } C \in \mathbb{R}\text{)}$$

Integral berechnen (Alternative 2)

0.5 1/2 $\int dx$ $\int dx$ Simp $\int dx$ $\int dx$

$F'=ah^3+a^2$

Keyboard

Math1	a	b	c	d	e	f
Math2	g	h	i	j	k	l
Math3	m	n	o	p	q	r
Trig	s	t	u	v	w	x
Var	y	z	()	,	⇒	CAPS
abc	←	↵	↵	Ans	EXE	

Algeb Standard Reell 2π

Integrand ist Ableitung F'
aller Stammfunktionen F

Gleichung markieren

Tipp: Stift von rechts nach links ziehen

Math1	Line	$\frac{\square}{\square}$	$\sqrt{\square}$	π	\Rightarrow
Math2	Define	f	g	i	∞
Math3	solve(dSlv	'	$\left\{ \begin{matrix} \square \\ \square \end{matrix} \right\}$	
Trig	<	>	()	{ }	[]
Var	\leq	\geq	=	\neq	$<$
abc	←	↵	↵	Ans	EXE

Integral berechnen (Alternative 2)

The screenshot shows the 'Edit Aktion' menu with 'Interaktiv' selected. The 'dSolve' option is highlighted. Below the menu is a keypad with mathematical symbols and variables.

Math1	a					
Math2	g	h	i	j	k	l
Math3	m	n	o	p	q	r
Trig	s	t	u	v	w	x
Var	y	z	$()$	$,$	\Rightarrow	CAPS
abc						

Buttons: \leftarrow , \rightarrow , Ans, EXE

Mode: Algeb Standard Reell 2π

Integrationsvariable
Stammfunktion

The 'dSolve' dialog box is shown with the following settings:

- Keine Bedingung
- Mit Bedingung
- Gleichung: $F' = ah^3 + a^2$
- Unab.Var.: h
- Abhä.Var.: F

Buttons: OK, Abbrechen

Math1	a	b	c	d	e	f
Math2	g	h	i	j	k	l
Math3	m	n	o	p	q	r
Trig	s	t	u	v	w	x
Var	y	z	$()$	$,$	\Rightarrow	CAPS
abc						

Buttons: \leftarrow , \rightarrow , Ans, EXE

Mode: Algeb Standard Reell 2π

Integral berechnen (Alternative 2)

The screenshot shows the 'Edit Aktion Interaktiv' window of a Casio calculator. The window title is 'Edit Aktion Interaktiv'. The main display area shows the command $\text{dSolve}(F'=a \cdot h^3 + a^2, h, F)$ and its result: $\left\{ F = \frac{a \cdot h^4}{4} + a^2 \cdot h + \text{const}(1) \right\}$. Below the result is a small square symbol. The calculator's interface includes a toolbar with icons for \sqrt{x} , $0.5 \frac{1}{2}$, a hand icon, $\int dx$, $\int dx$, 'Simp', $\int dx$, a dropdown arrow, a parabola icon, and another dropdown arrow. At the bottom, there are mode buttons for 'Algeb', 'Standard', 'Reell', and '2π', along with a calculator icon.

Stammfunktion mit Integrationskonstante,
 $\text{const}(1)$ ist beliebige Zahl

Lösung:

$$\frac{ah^4}{4} + a^2h + C \text{ (mit } C \in \mathbb{R}\text{)}$$