GERADE

Gleichung

$f(x) = mx + q$

Ebene

(x|y)

Erweiterung Proportionalität

$f(x) = mx$

$f : \mathbb{R} \to \mathbb{R}$

(überall definiert)

Differenzenquotient (Steigung)

$\frac{\Delta y}{\Delta x} = m$

PARABEL

Abstand Brennpunkt – Leitlinie

$p = \frac{1}{4a}$

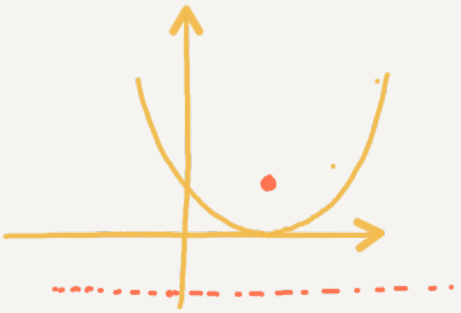
Brenn-punkt

Leitlinie

Reflexion

$ax^2 + bx + c$

Normalform



$a(x-u)^2 + v$

Scheitelform

Ergänzung (quadratische)

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

TRIGONOMETRIE

Tri
3

Gon
"Ecke"

Metric
"Vermessen"

Guggelhopf
AHA
GEHT AUCH

sin
cos
tan

Einheitskreis

$1 = \sin^2 + \cos^2$

Eins

Radian

$2\pi \sim 360°$

innenwinkel

Σ 180°

orthogonal

$c^2 = a^2 + b^2 - 2ab\cos(\gamma)$

$\frac{a}{\sin(\alpha)} = \frac{b}{\sin(\beta)}$

angensll

Regeln

$\frac{\sin}{\cos}$

TAGES-
LÄNGEN

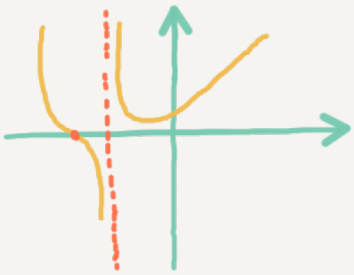
$f(t) = A \cdot \sin(f(t-\varphi)) + m$

POTENZ

Potenzgesetze

$$a^n \cdot a^m = a^{n+m}$$
$$(a^n)^m = a^{n \cdot m}$$

Zähler (Nullstellen)
Nenner (Polstellen)



Permanenzprinzip

$a^n := a \cdot a \cdot \ldots \cdot a \quad (n \in \mathbb{N})$

$\rightarrow a^r \quad (r \in \mathbb{R})$

... + O(n)
(Näherungen)

TAYLOR

$$\sin(x) = x - \frac{x^3}{3!} + \frac{x^5}{5!} \ldots$$

Taylorpolynom

erweiterte Exponenten

$$a^0 = 1$$
$$a^{-r} = \frac{1}{a^r}$$
$$\sqrt[n]{a} = a^{\frac{1}{n}}$$

EXPONENTIELL

Exponent ist variabel

$a \cdot b^x$

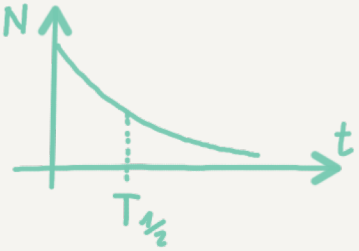
Bernoulli (Zins)

$$e = \lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$$

Halbwertszeit

TIME

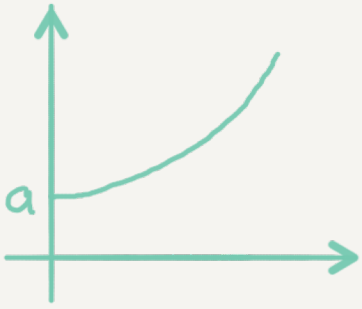
zeitliche Prozesse (z.B. Zerfall)



PHYSIK

Offset (Startwert)

$a \cdot b^x$



Stoffmenge N

$$N(t) = N_0 \cdot e^{\frac{\ln(2)}{T_{1/2}} \cdot t}$$

EULER

$e \approx 2.7$

naturalis · invers · Euler · log

$e^x \leftrightarrow \ln(x)$

LOGARITHMEN

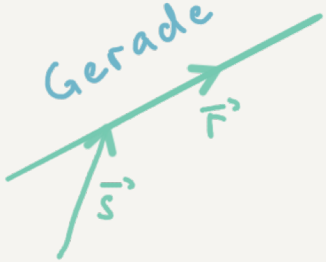
$y = b^x \leftrightarrow x = \log_b(y)$

VEKTOREN

Einheitsvektoren

$\vec{e}_x$, $\vec{e}_y$, $\vec{e}_z$

Gerade



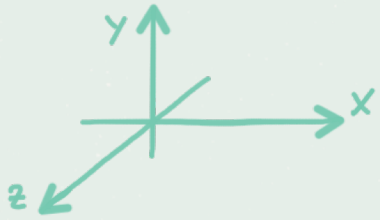
$g: \vec{s} + t \cdot \vec{r}$

Reflexion

Normalenvektor

Vektor
(Länge & Richtung)

Koordinaten-
system 3D



Operationen

add

S-mul

skalar

kreuz

Ebene

$E: Ax + By + Cz + D = 0$

FOLGEN

1 1 2 3 5 8 13 ...

Fibonacci

linear ↔ arithmetisch

exponentiell ↔ geometrisch

Funktion

$f: \mathbb{N} \to \mathbb{R}$

$f(n) = a_n$

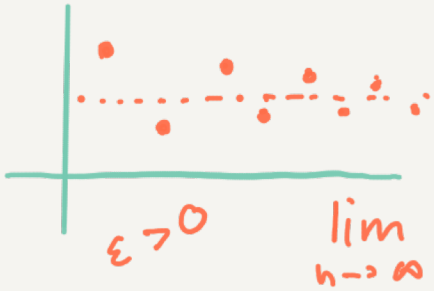
Index
Position

Oszillieren

$(-1)^n$

$\sin\left(\frac{\pi}{2} \cdot n\right)$

LIMES
(Grenze)



geometrisch & arithmetisch

q

d

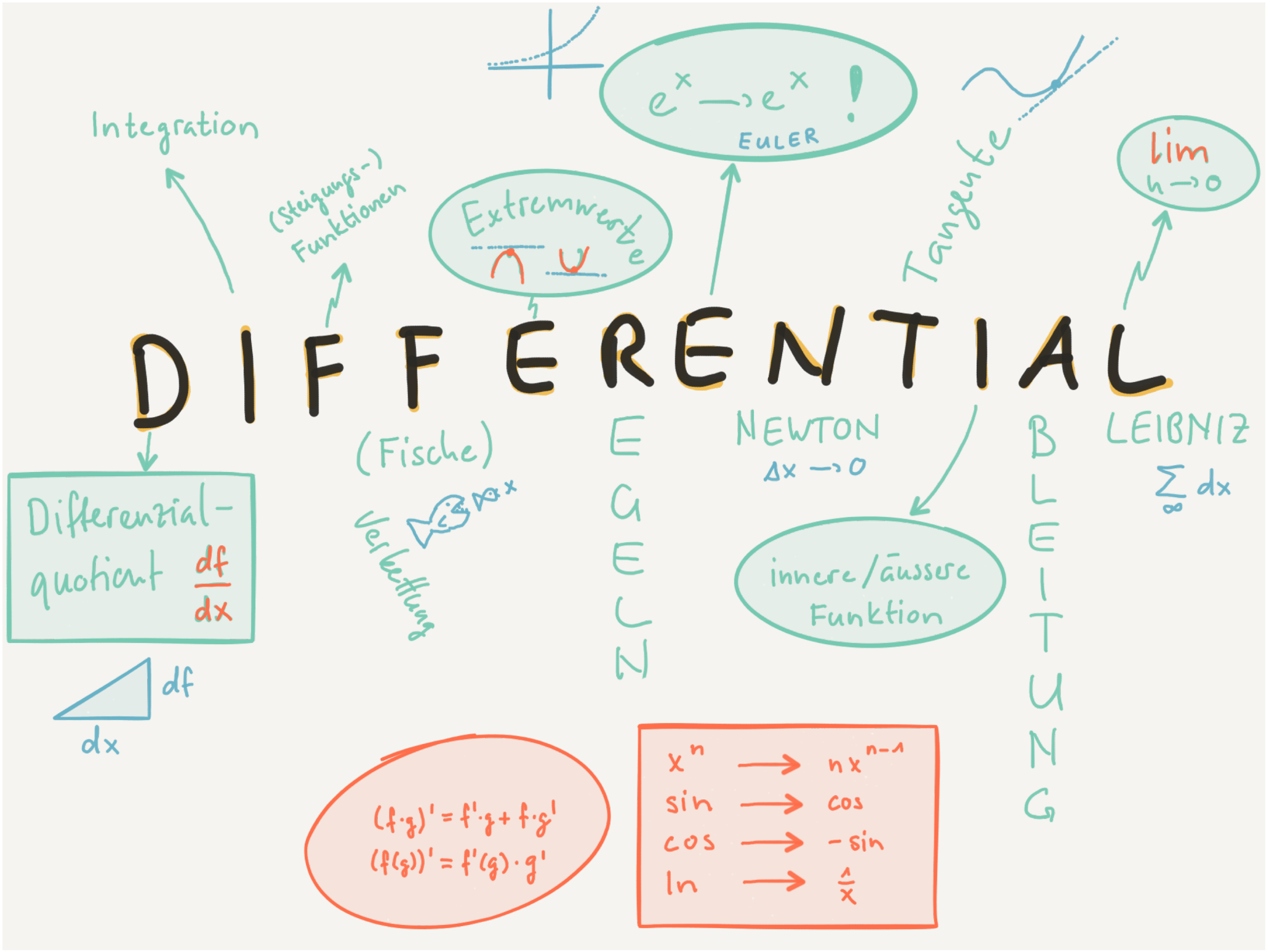
$$s = \frac{a_1}{1-q}$$

$$a_n = a_1 + (n-1) \cdot d$$

$$s_n = (a_1 + a_n) \cdot \frac{n}{2} \quad \text{(Gauss)}$$

$$a_n = a_1 \cdot q^{n-1}$$

$$s_n = a_1 \cdot \frac{q^n - 1}{q - 1}$$


DIFFERENTIAL
Integration
(Steigungs-) Funktionen
Extremwerte
$e^x \to e^x$!
EULER
Tangente
lim $h \to 0$
Differential-quotient $\frac{df}{dx}$
df
dx
(Fische)
Verkettung
EGELN
NEWTON
$\Delta x \to 0$
innere/äussere Funktion
BLEITUNG
LEIBNIZ
$\sum_{\infty} dx$
$(f \cdot g)' = f' \cdot g + f \cdot g'$
$(f(g))' = f'(g) \cdot g'$
$x^n \to n x^{n-1}$
sin → cos
cos → - sin
ln → $\frac{1}{x}$

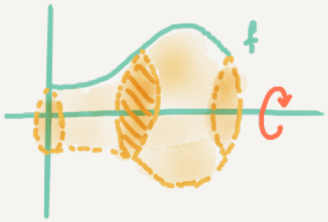
INTEGRAL

Integrationskonstante

C

trunk
(Stammfunktion)

Rotationsvolumen



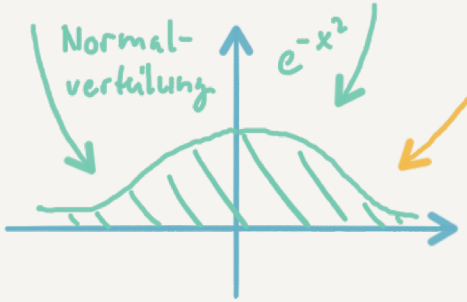
$$RotV = \pi \int [f(x)]^2 \, dx$$

Limit

$$A(x+h) - A(x) = f(x) \cdot h \quad (h \to 0)$$

Integralzeichen
(Summe)

$$\int$$



Gauss'sche Glockenkurve

Grenzen

Aera

$$\int_a^b f(x) \, dx = F(b) - F(a)$$

STOCHASTIK

binompdf
binomcdf

TR

Hypothese

(Binomial-) Tests

(Binomial-) Koeffizienten

$\binom{0}{0}$
$\binom{1}{0}$ $\binom{1}{1}$
$\binom{2}{0}$ $\binom{2}{1}$ $\binom{2}{2}$
$\binom{3}{0}$ $\binom{3}{1}$ $\binom{3}{2}$ $\binom{3}{3}$

Sicheres Ereignis

$P(\Omega) = 1$

$0 = P(\varnothing)$

unmögliches Ereignis

KOMBINATION

$\binom{42}{6}$

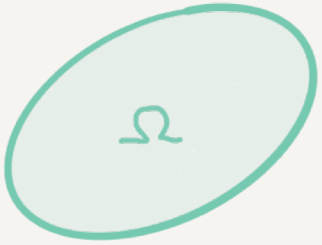
Axiome (Kolmogoroff)

positiv
normiert
additiv

Irrtums-wahrscheinlichkeit

α_p

Stichprobenraum



günstig / möglich