BBI WIEN

Funktionen in 'R^2
9. Schulstufe

Schwarzdruckkopiervorschläge mit großer Schrift und starken Linien

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Inhalt: Grafiken zu den Themen: einem x-Wert werden mehr als ein y-Wert zugeordnet, lineare Funktion, quadratische Funktion, Polynomfunktion 3.Grades, Polynomfunktion 4. Grades, gerade Funktion, ungerade Funktion, gebrochen rationale Funktion mit x im Nenner, gebrochen rationale Funktion mit x^2 im Nenner, Sinusfunktion und Einheitskreis

Inhalt

Abkürzungen

f_lin: lineare Funktion

f_q: quadratische Funktion

f_G3: Funktion 3. Grades

f_G4: Funktion 4. Grades

f_g: gerade Funktion

f_u: ungerade Funktion

f_gebr1: gebrochen rationale Funktion Grad 1 f_gebr2: gebrochen

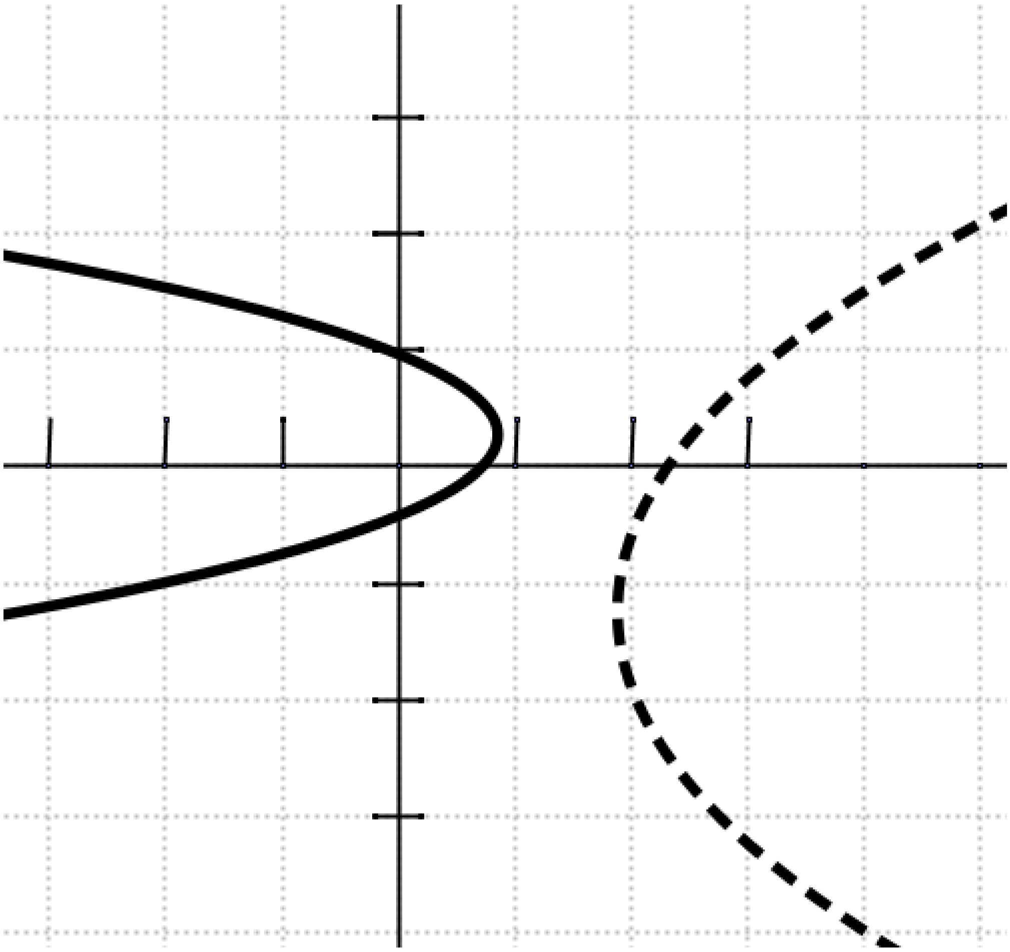
rationale Funktion Grad 2

f_sin: Winkelfunktion

EK: Einheitskreis

keine Funktionen

mehr y-Werte zu einem x



f_lin: f(x) =k *x +d

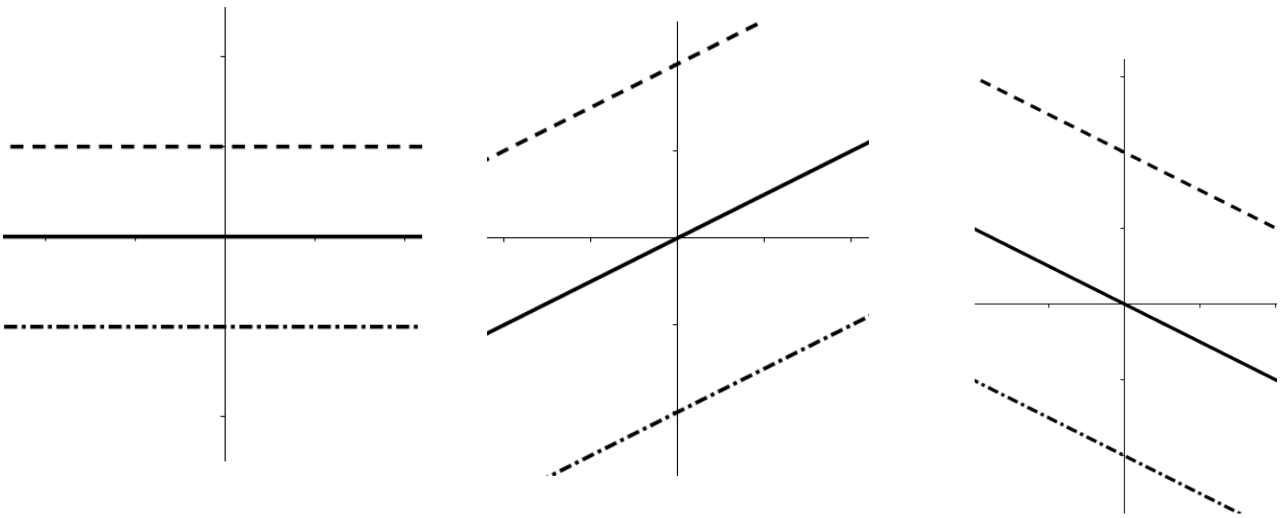
f(x) =k *x +d

d =0:

d >0:

d <0:

k =0 || k >0 || k <0



f_q .1: f(x) =a *x^2

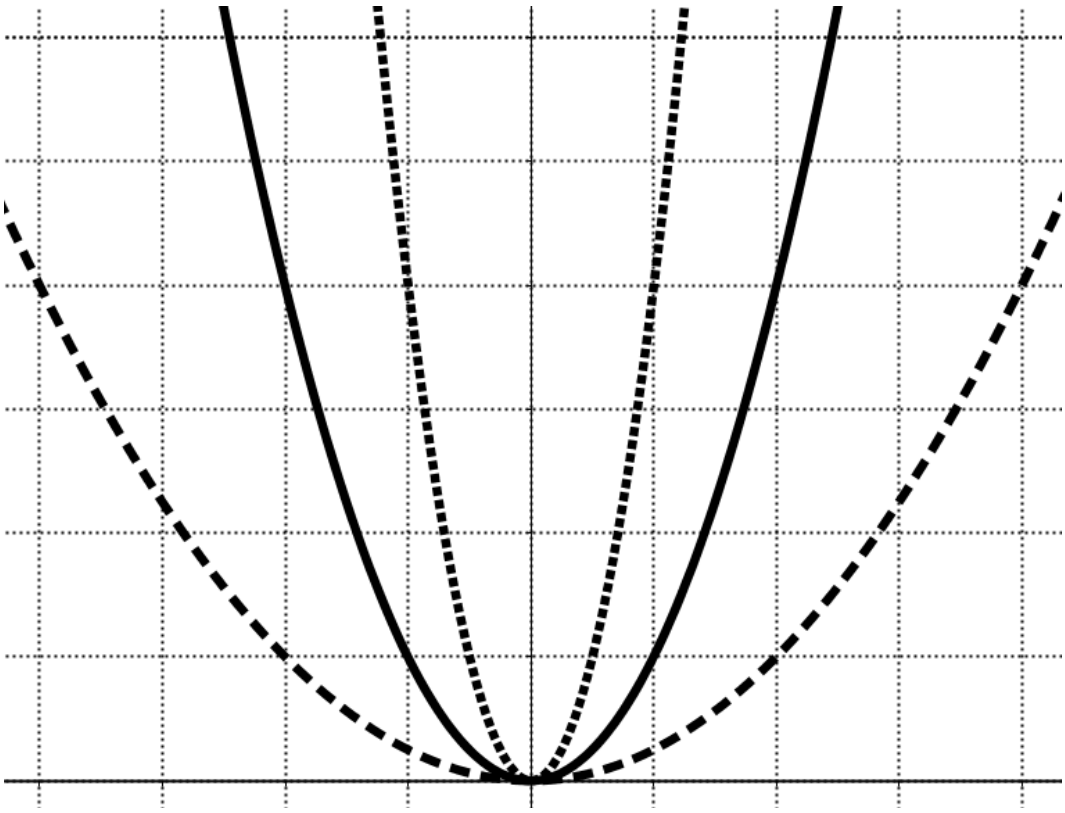
Parabel nach oben offen:

a >0: 

f(x) =x^2; a =+1:

f(x) =1/4 *x^2; a =1/4:

f(x) =4 *x^2; a =4:



f_q /2: f(x) =a *x^2

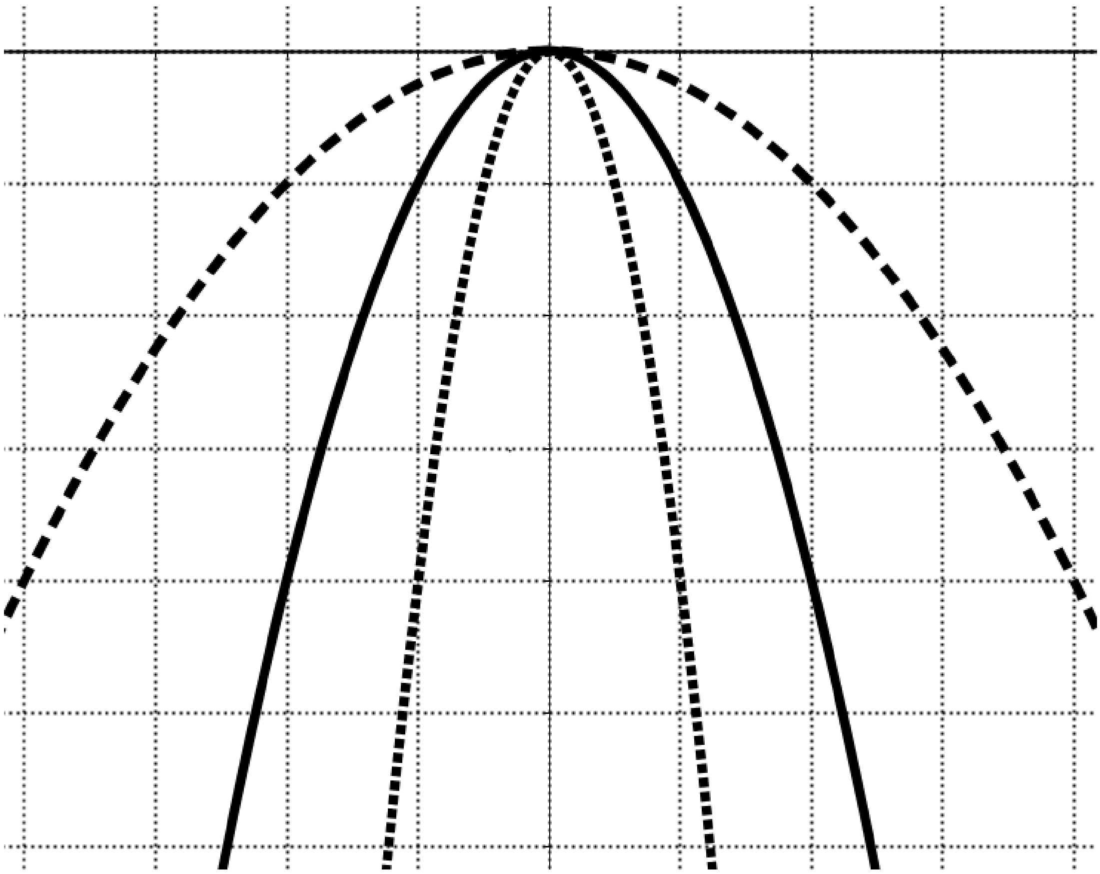
Parabel nach unten offen:

a <0: 

f(x) =-x^2; a =-1:

f(x) =-1/4 *x^2; a =-1/4:

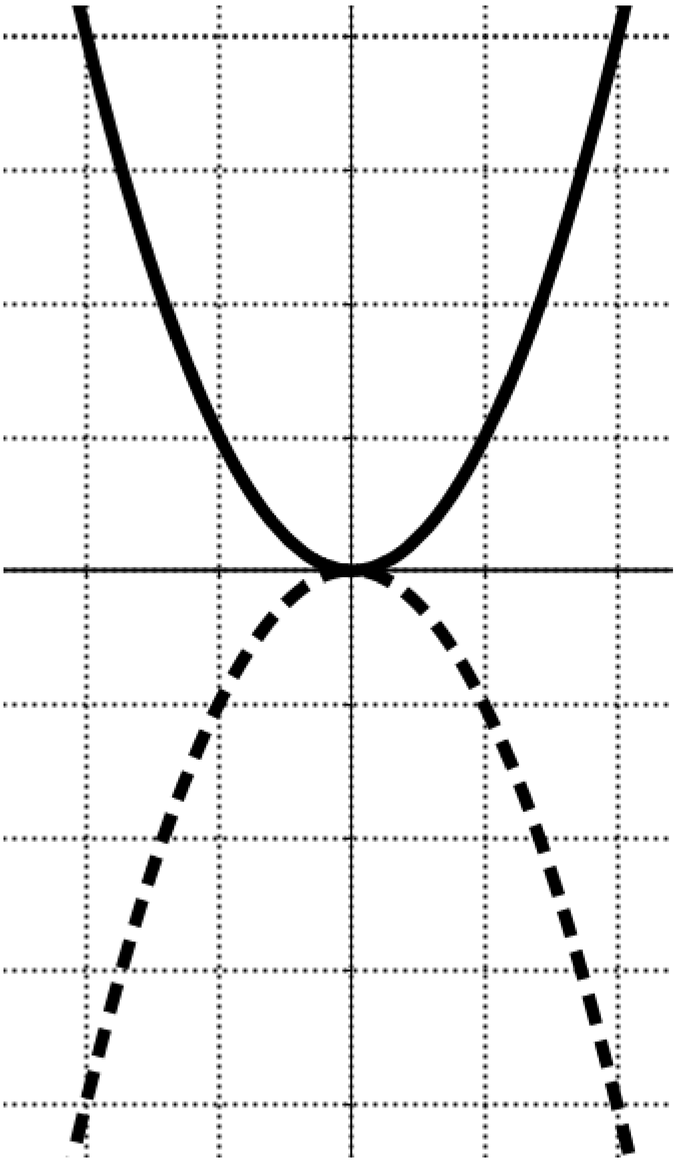
f(x) =-4 *x^2; a =-4:



f_q.3: f(x) =a *x^2

Parabel spiegeln

a =1: —— ||| a =-1: ------



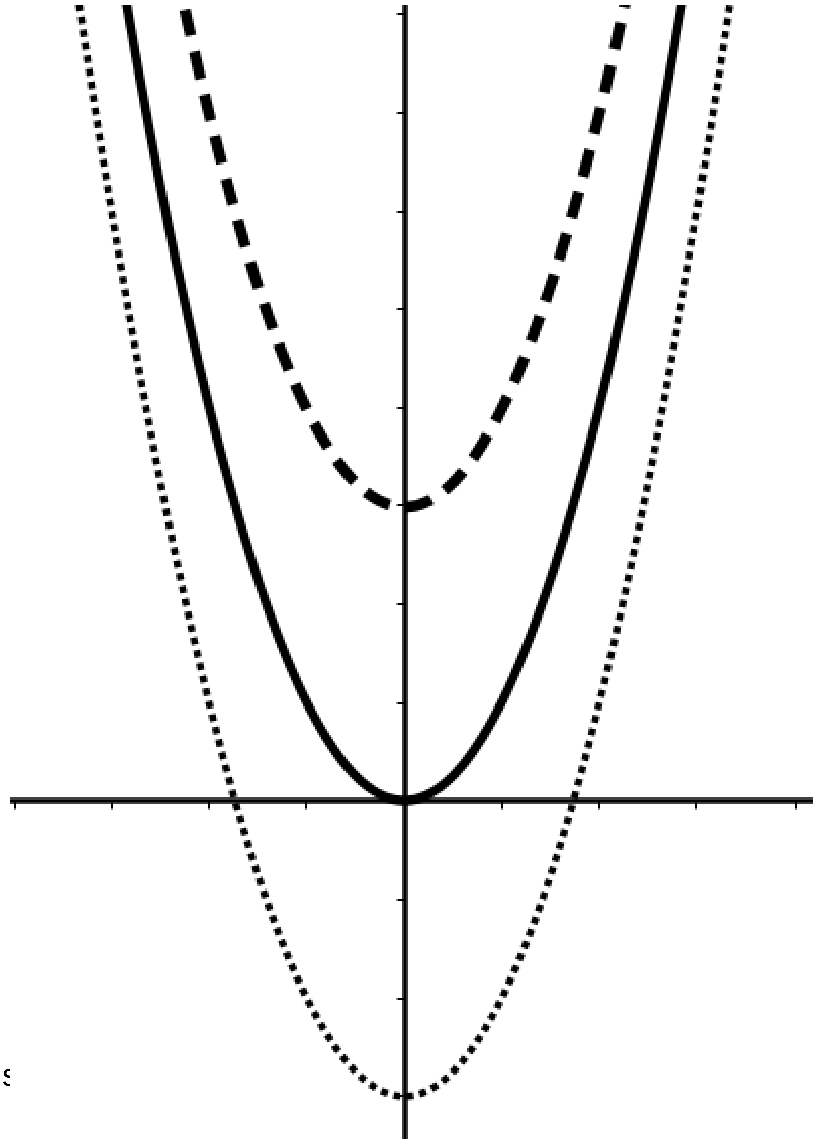
f_q.4: f(x) =x^2 +c

senkrecht verschieben

c =0 (f(x) =x^2): ———

c>0 (hinauf): ------

c <0 (hinunter): ....



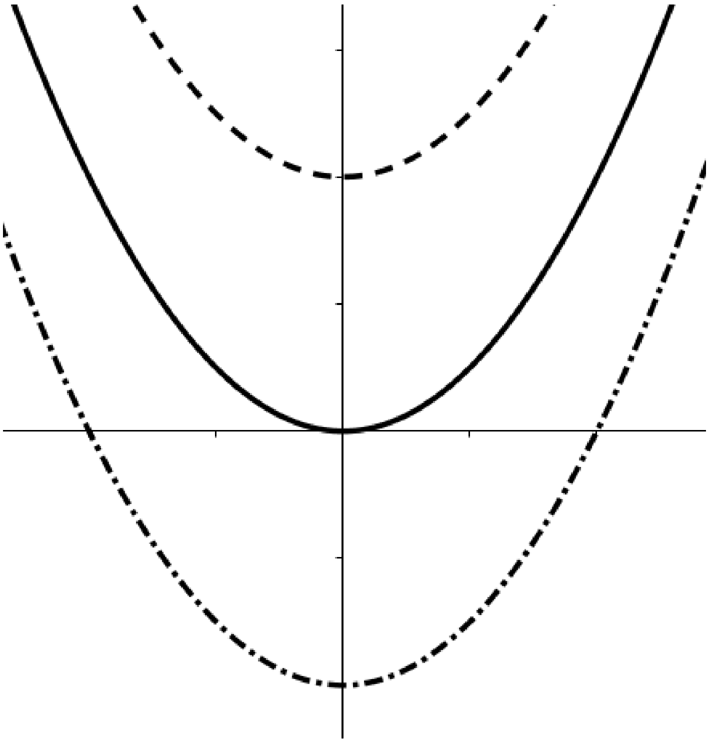
f_q.5: f(x) =a *x^2 +c

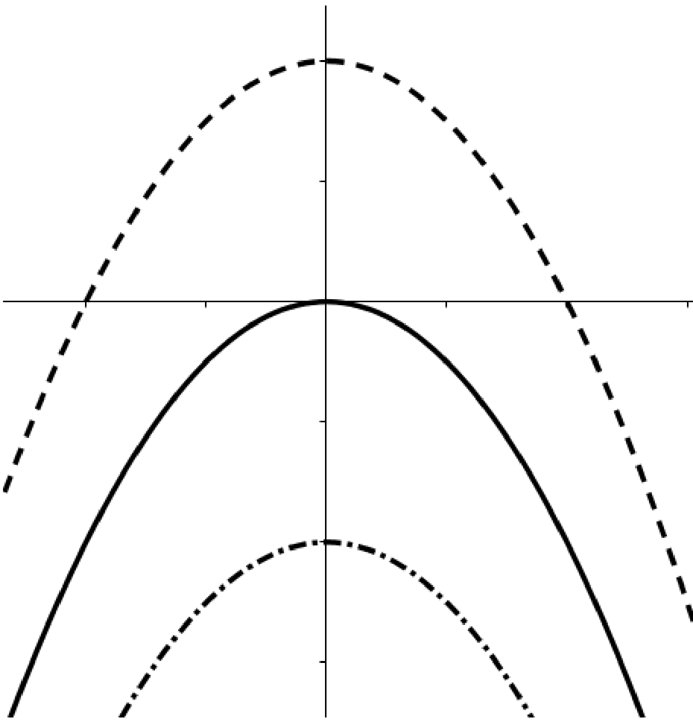
c =0:

c>0:

c <0:

a >0 ‖ a <0





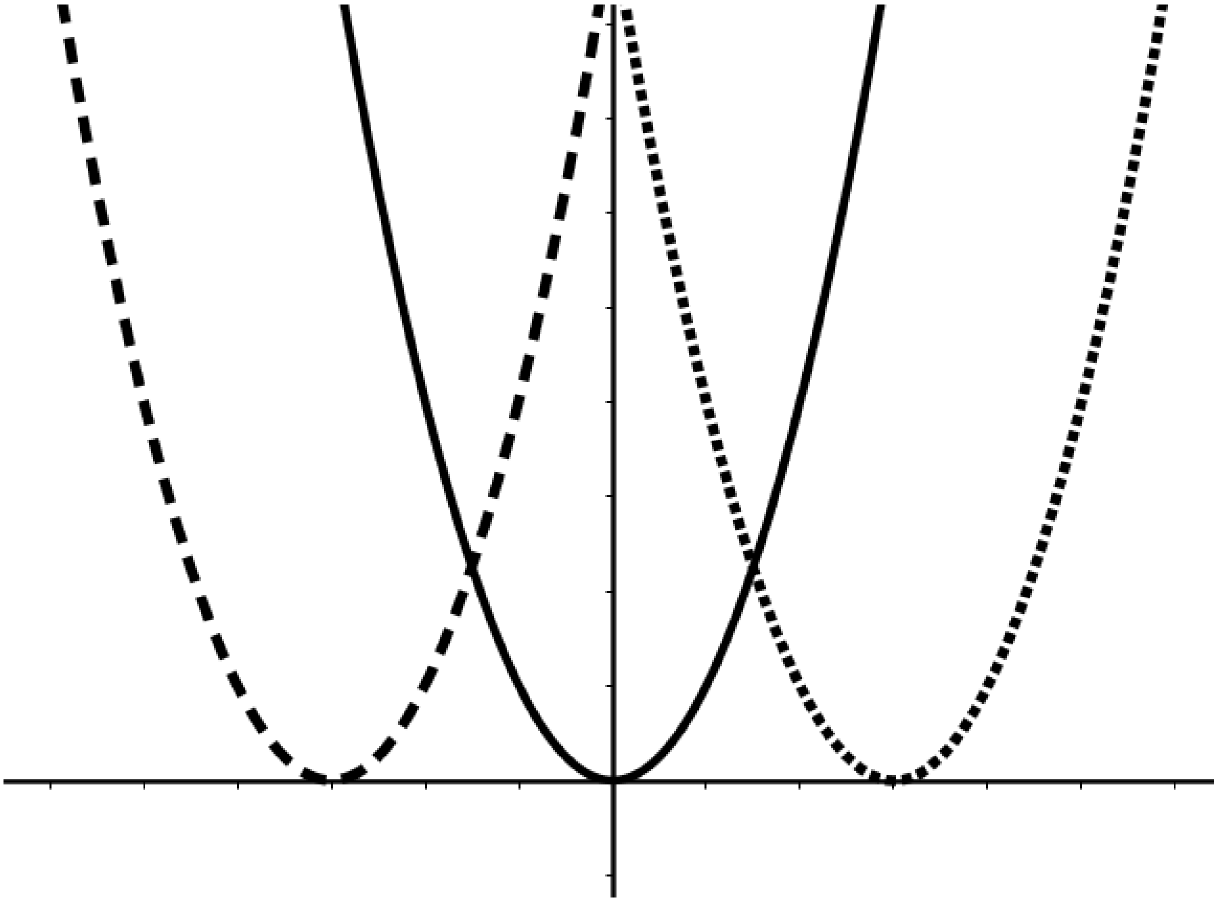
f_q.6: f(x) =(x +b)^2

waagrecht verschieben

b =0 (f(x) =x^2): ———

b>0 (nach links): - - - -

b <0 (nach rechts): ....

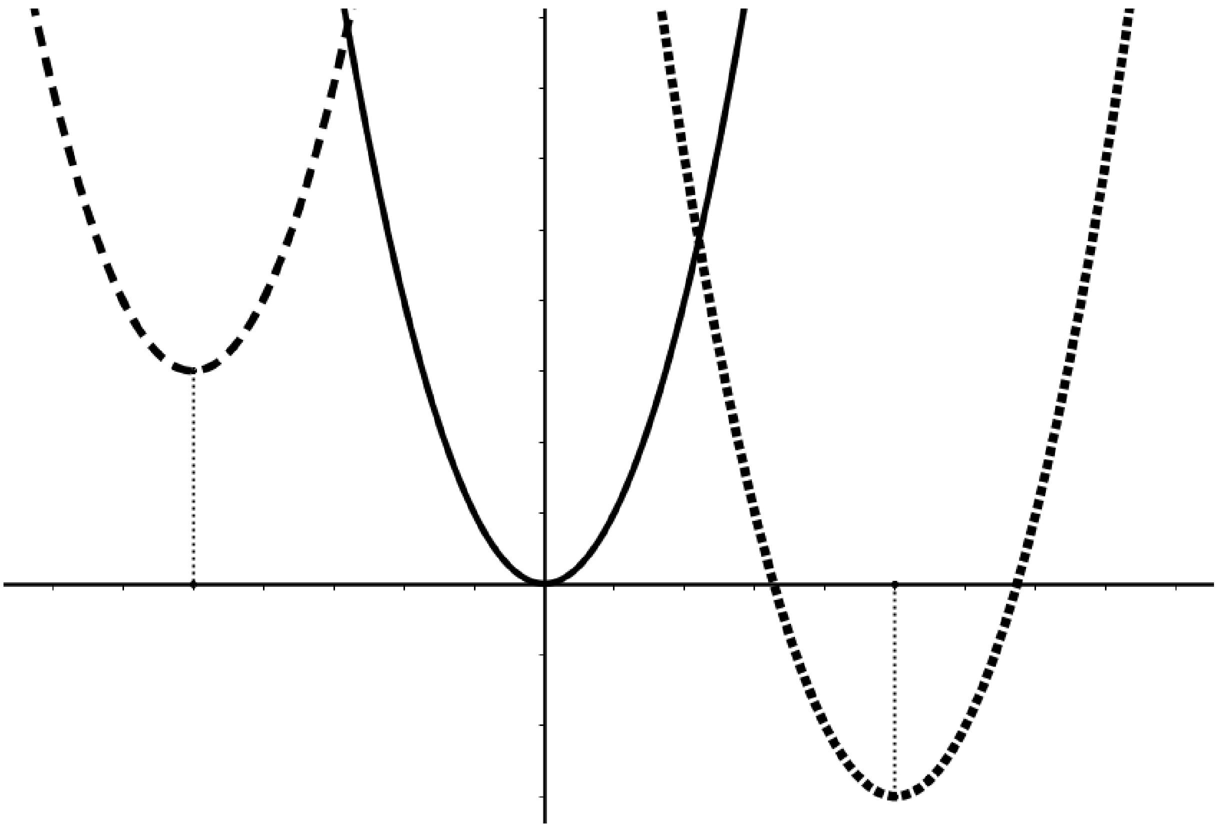


f_q.7: $f(x) = (x+b)^2 + c$

$b = 0$, $c = 0$ ($f(x) = x^2$):

$b > 0$, $c > 0$ (li, hinauf):

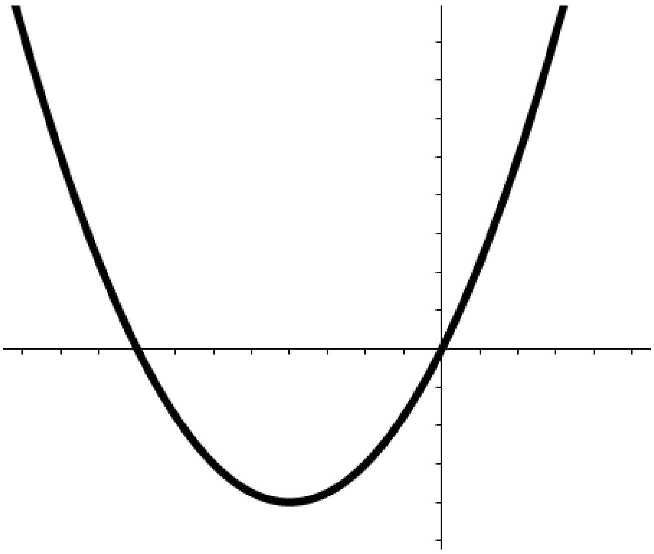
$b < 0$, $c < 0$ (re, hinunter):

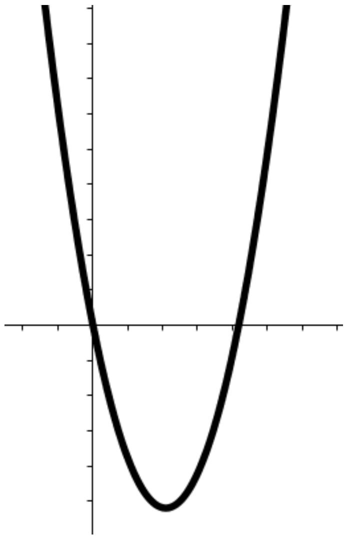


f_q.8: f(x) =a *x^2 +b *x

enthält Ursprung (0|0)

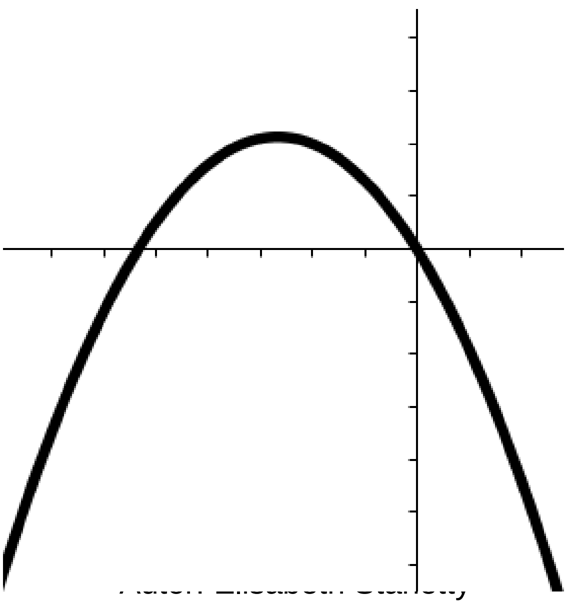
a >0, b >0 a >0, b <0

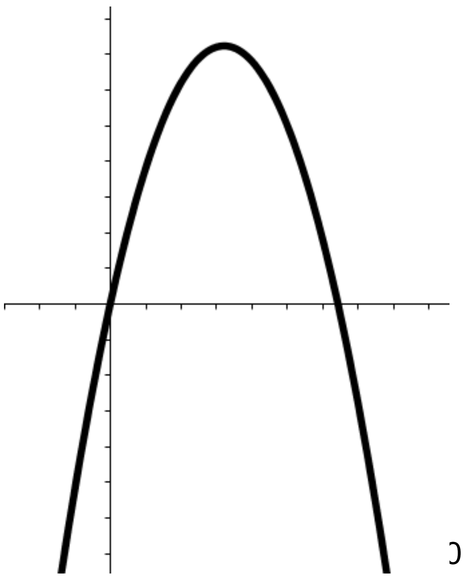




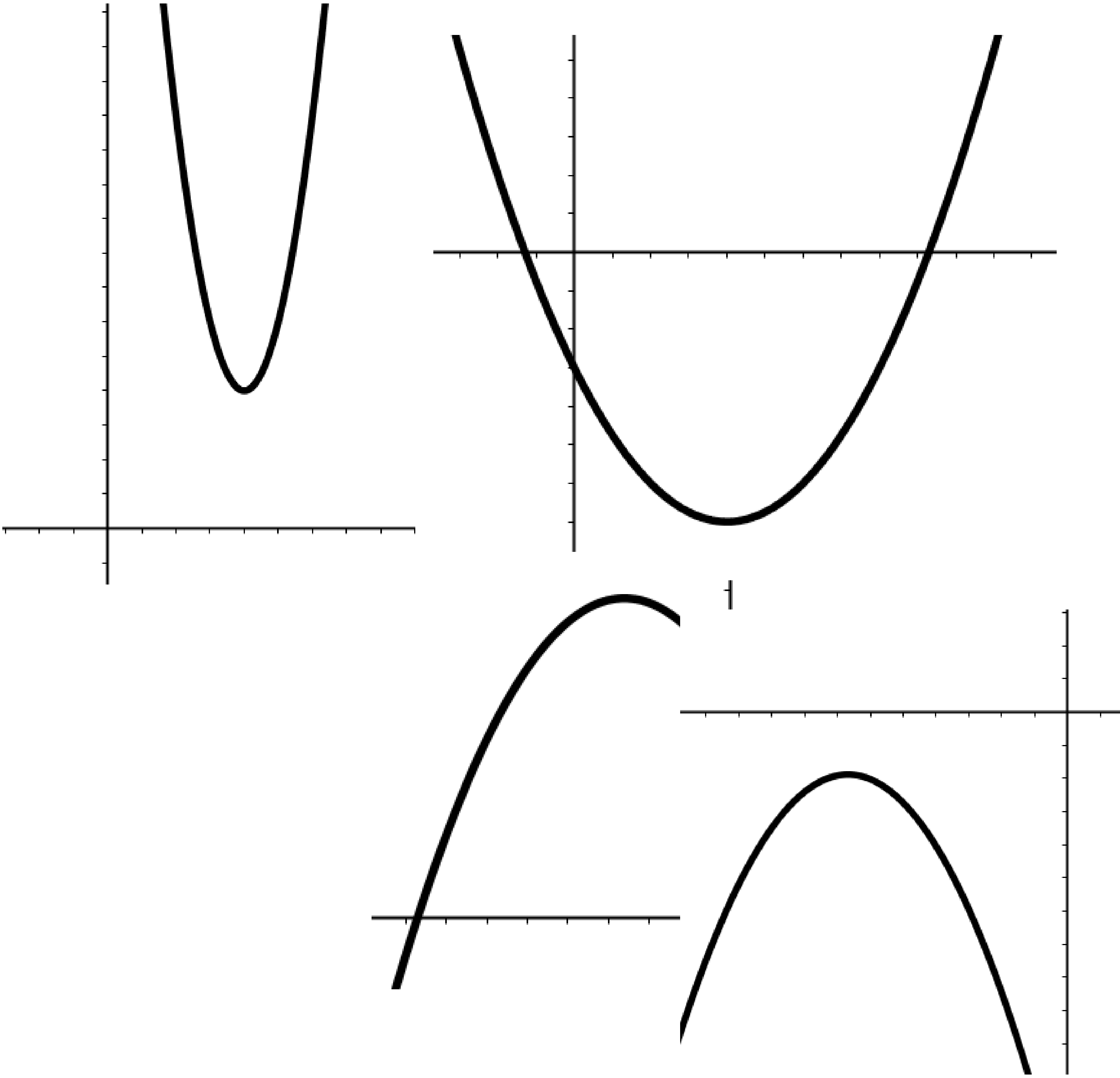
a

<0, b >0 a <0, b <0





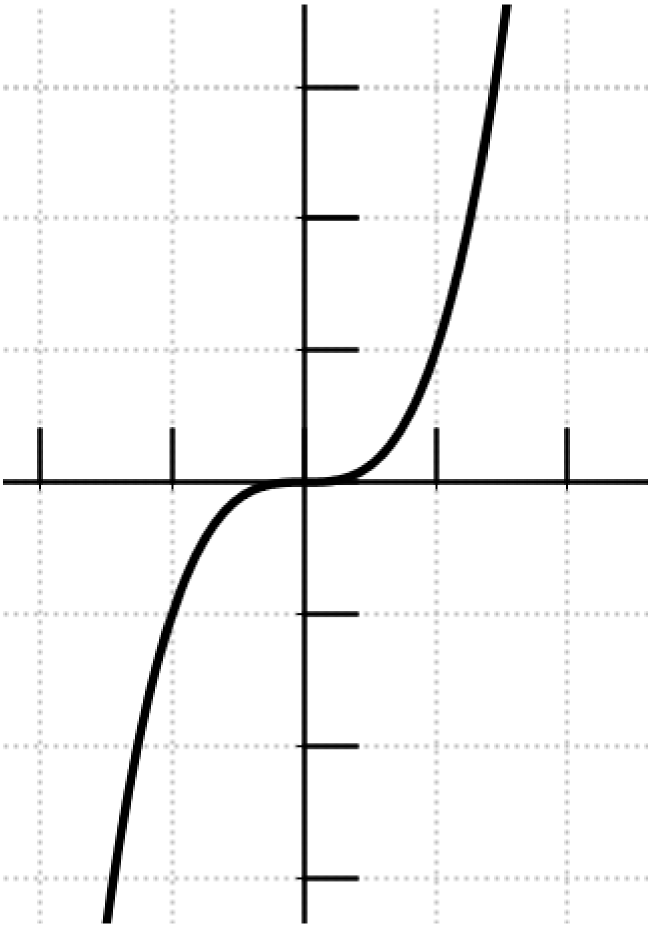
f_q.9: f: a *x^2 +b *x +c

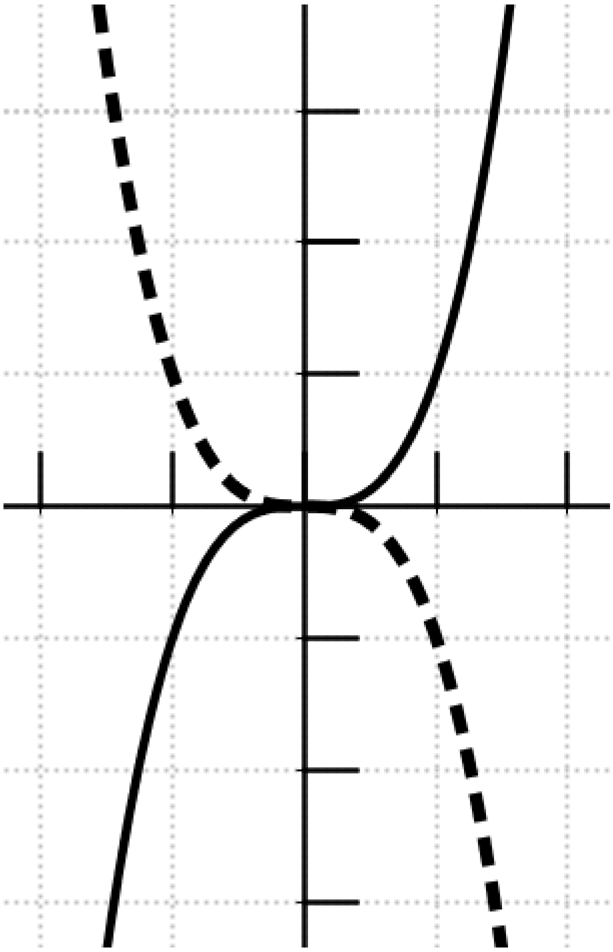


f_G3.1: f(x) =a *x^3

a =1 (f(x) =x^3): ———

a =-1(f(x) =-x^3): - - - -





f_G3.2: f(x) =a *x^3 +c

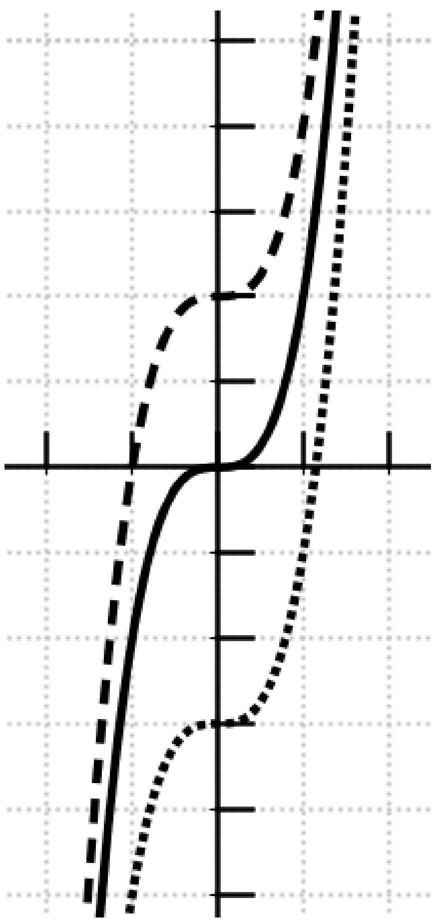
senkrecht verschieben

a >0, c =0:

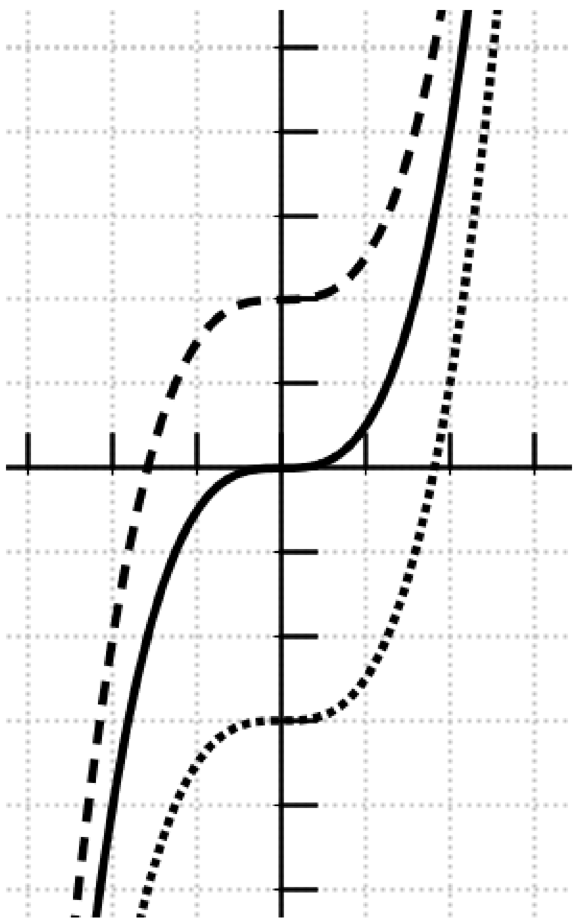
a >0, c >0 (hinauf):

a >0, c <0 (hinunter):

a=2



a =0,5



f_G3.3: f(x) =a *x^3 +c

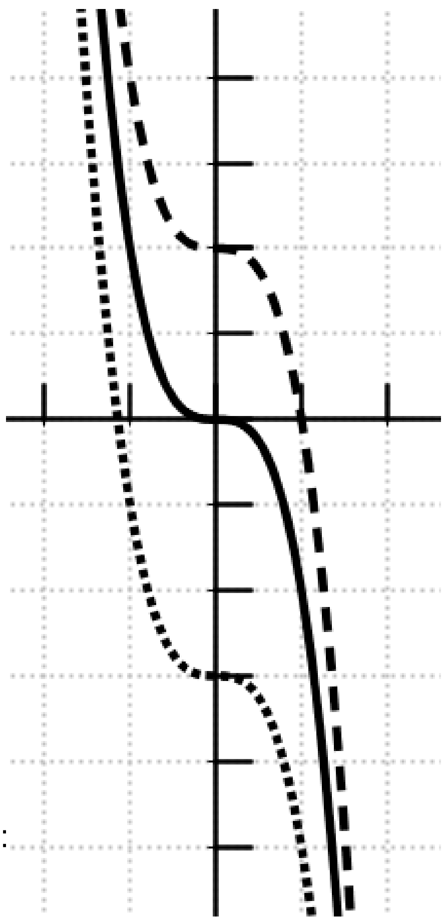
senkrecht verschieben

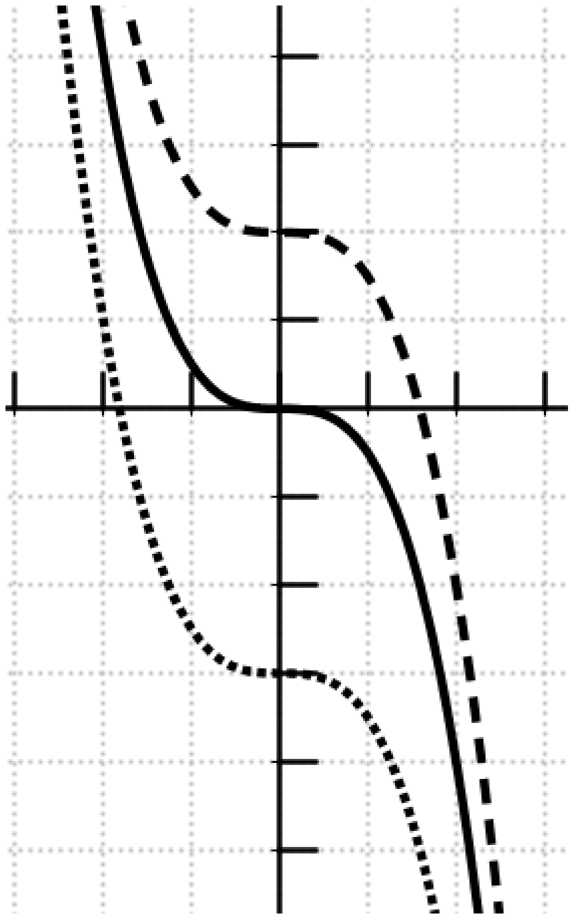
a <0, c =0: ———

a <0, c >0 (hinauf): – – – -

a <0, c <0 (hinunter): ....

a =-2 a =-0,5





Autor:

f_G3.4: f(x) =(x +b)^3

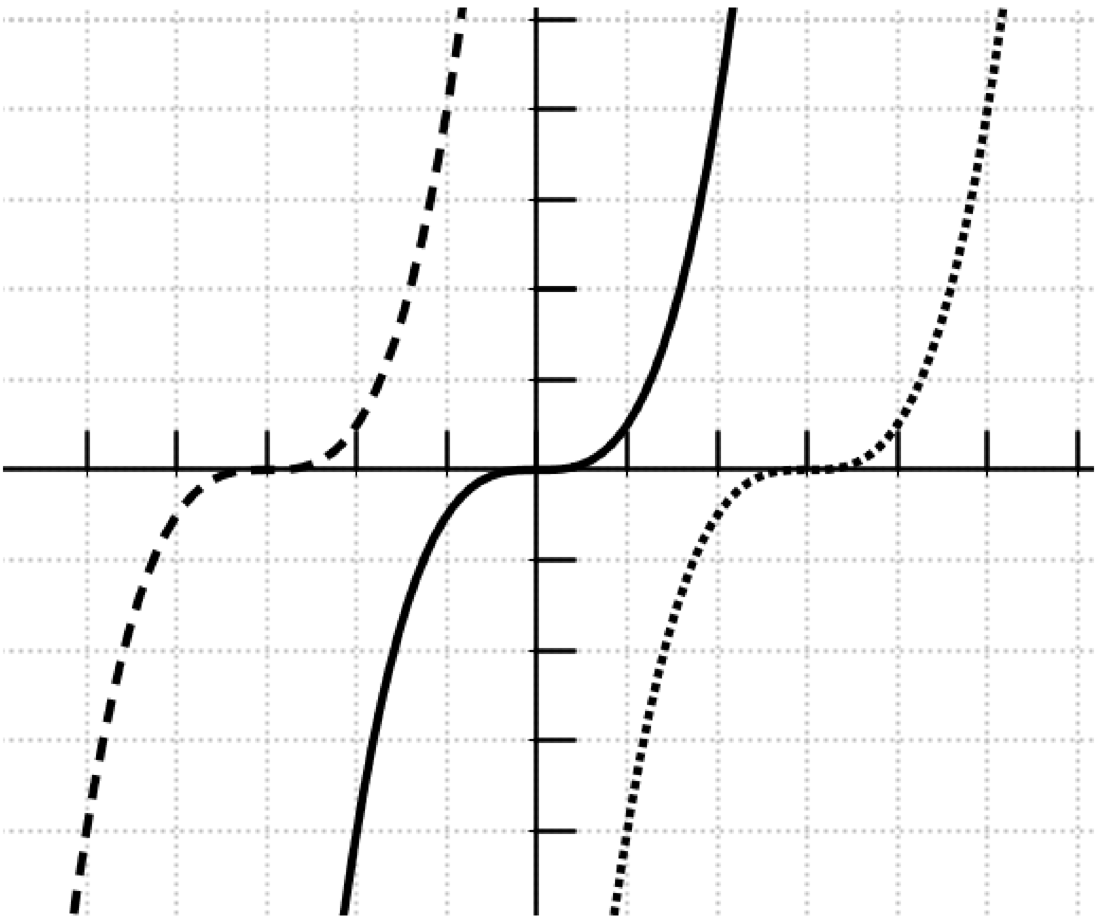
waagrecht verschieben

a >0, b =0: ———

a >0, b >0 (nach links: – – – -

a >0, b <0 (n. rechts): ....

a =0,5



f_G3.5: f(x) =(x +b)^3

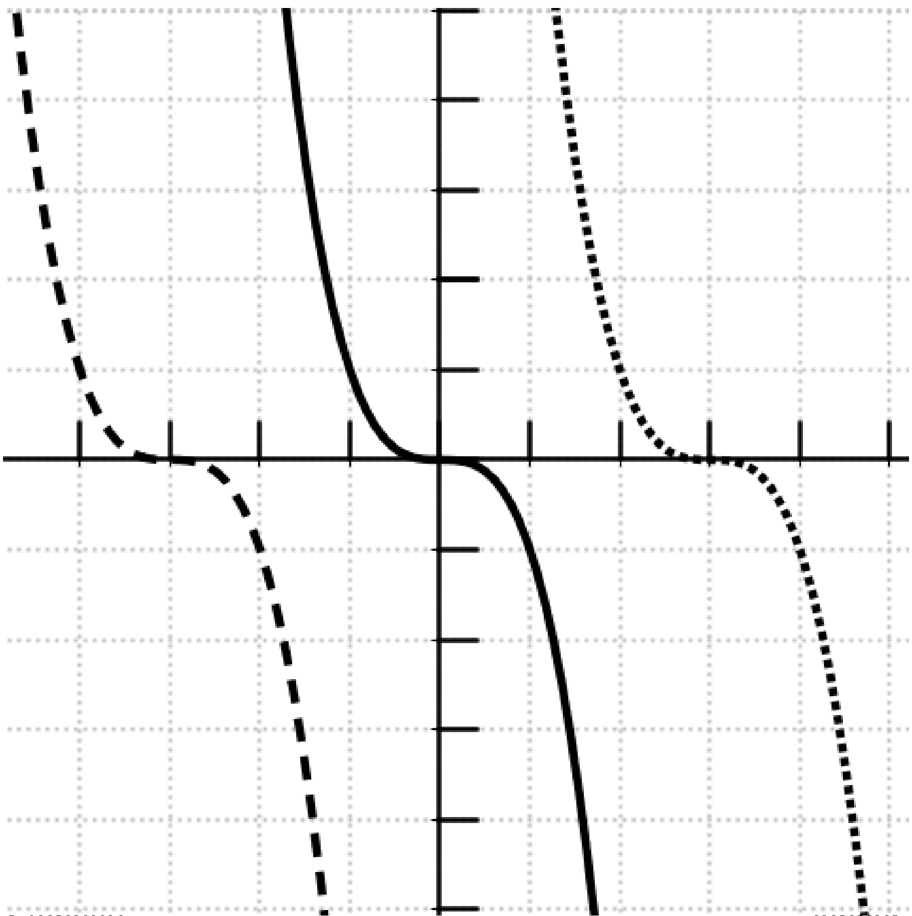
waagrecht verschieben

a <0, b =0: ———

a <0, b >0 (nach links: – – – -

a <0, b <0 (n. rechts): ....

a =-1

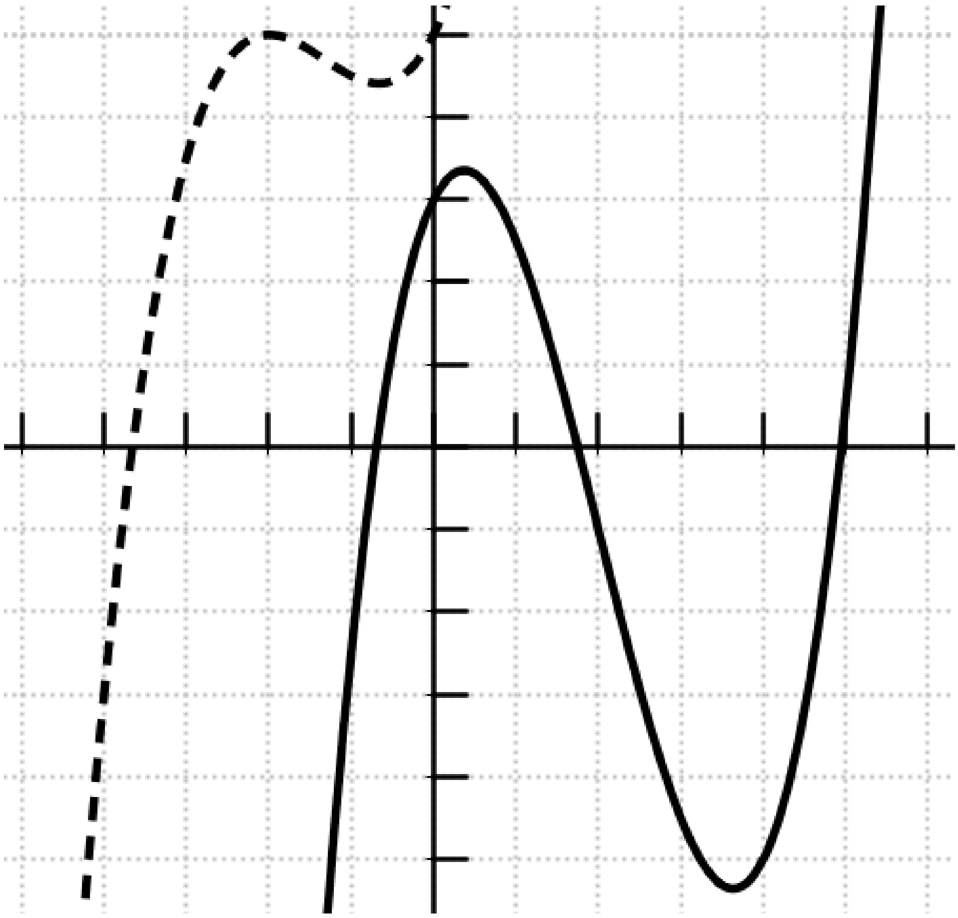


f_G3.6: a *x^3 +b *x^2 +c *x +d

enthält Punkt (0|d)

1 bis 3 Nullstellen

a >0: beginnt steigend

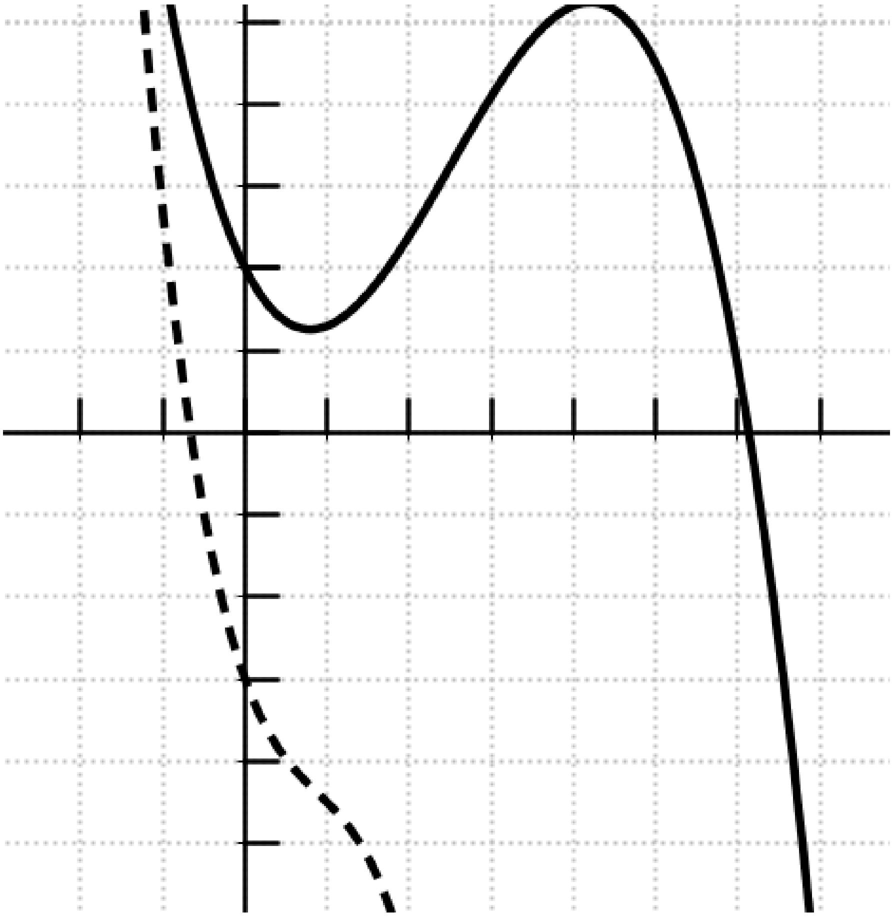


f_G3.7: a *x^3 +b *x^2 +c *x +d

enthält Punkt (0|d)

1 bis 3 Nullstellen

a <0: beginnt fallend



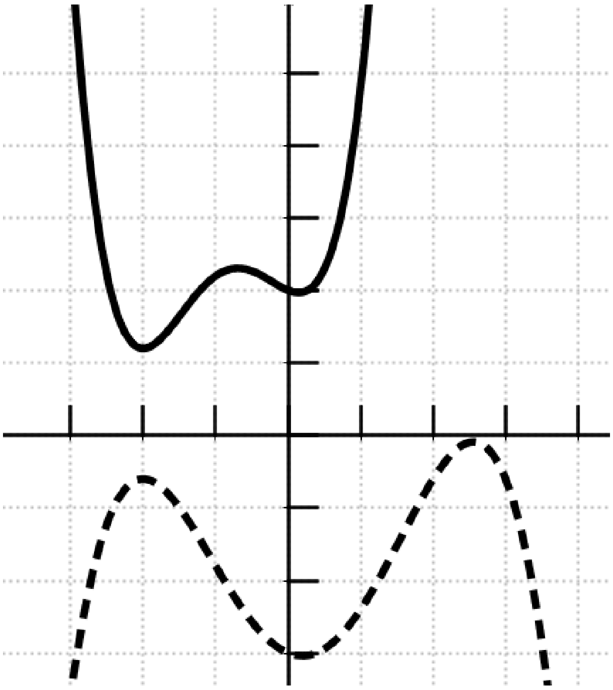
f_G4.1: f(x) =a *x^4 +b *x^3 +c *x^2 +d *x +e

enthält Punkt (0|e),

0 bis 4 Nullstellen

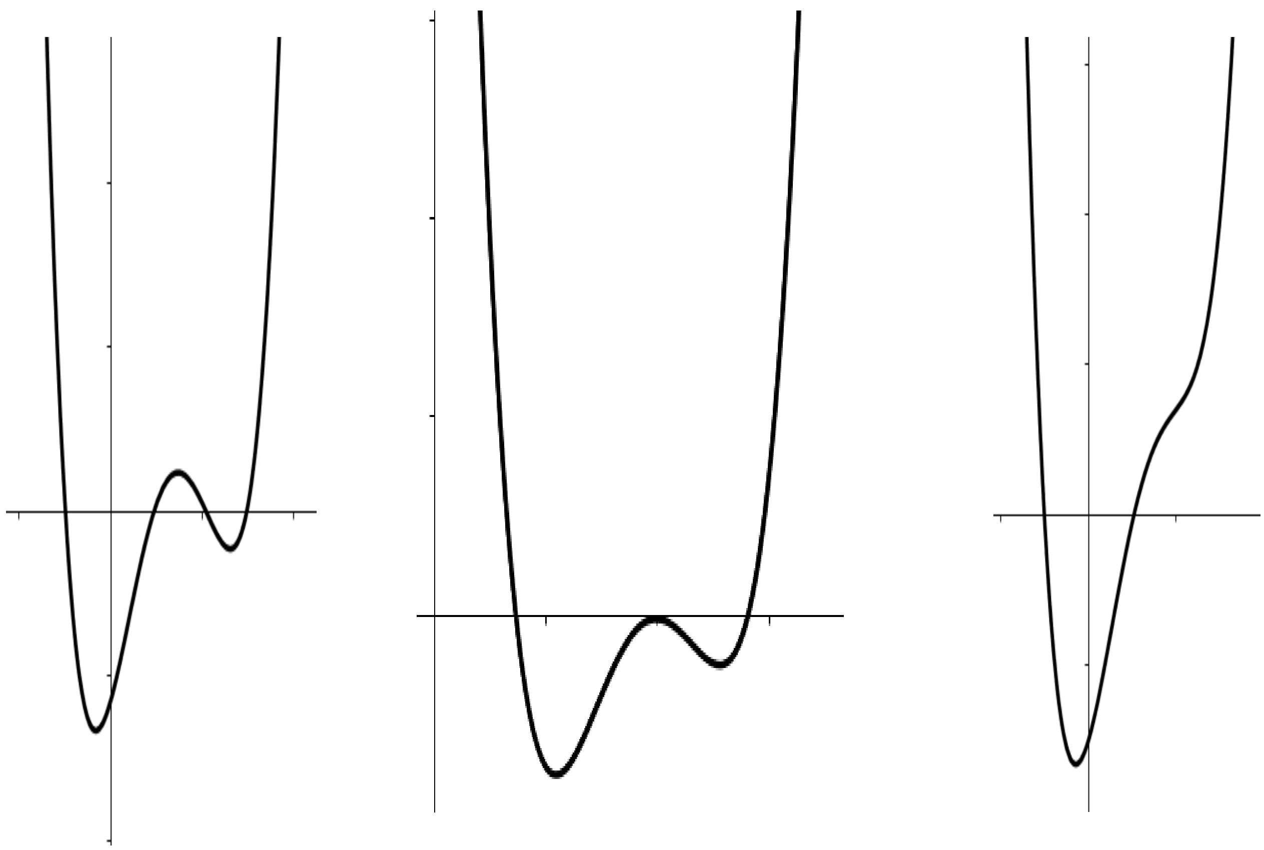
a >0: beginnt fallend

a <0: beginnt steigend



f_G4.2: f(x) =a *x^4 +b *x^3 +c *x^2 +d *x +e

Doppel-S-Kurve verschedenste Ausprägungen



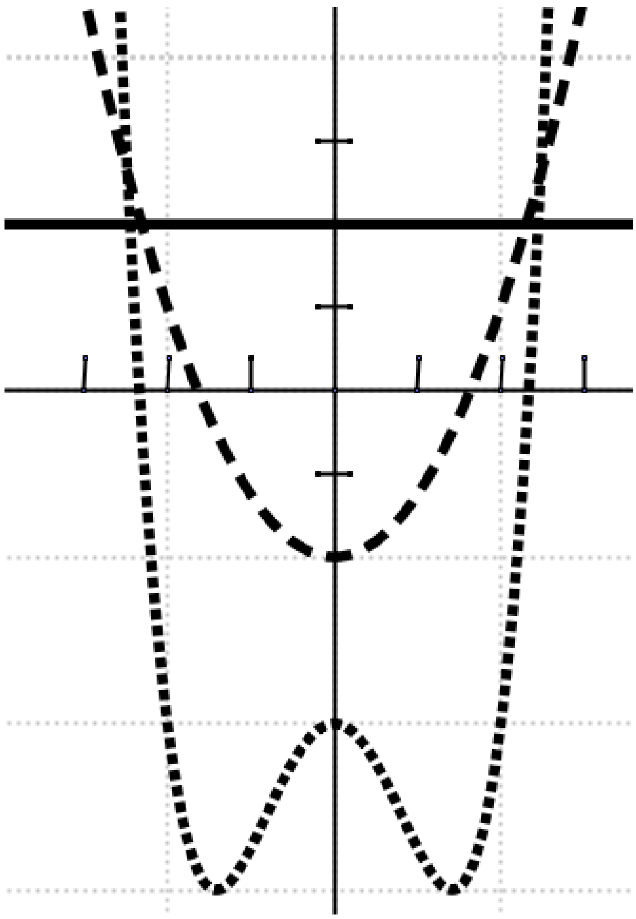
f_g: Hochzahl gerade

Symmetrisch zur senkrechten Achse, a <>0

f(x) =a *x^0 =a ————

f(x) =a *x^2 +b - - - -

f(x) =a *x^4 +b*x^2 +c ....



f_u: Hochz. ungerade

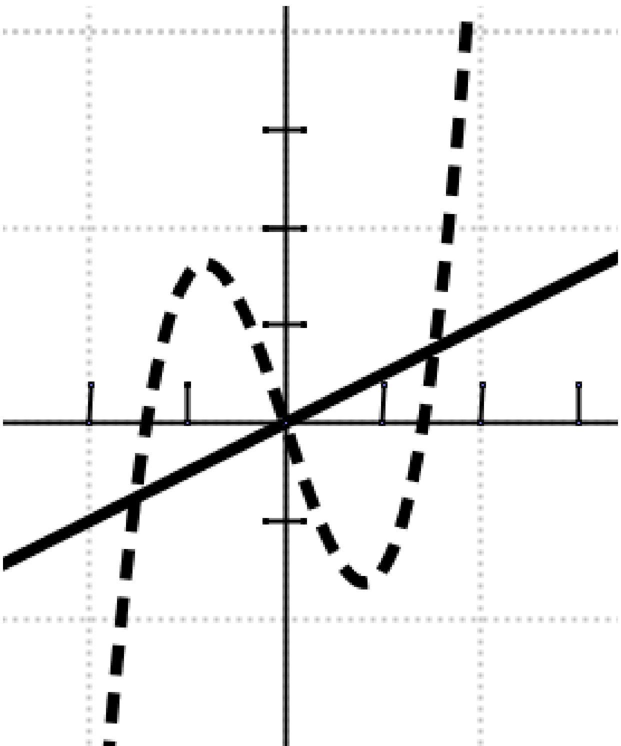
Symmetrisch zum

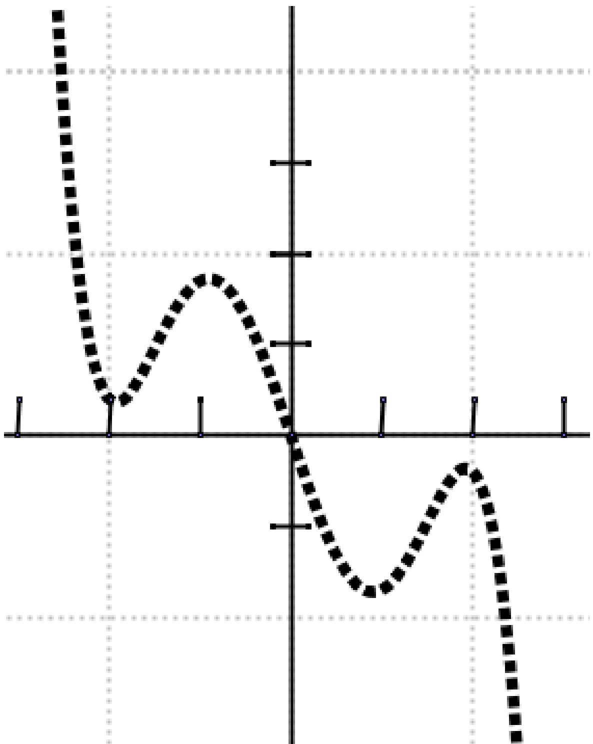
Ursprung, a <>0

$f(x) = a * x$

$f(x) = a*x^3 + b*x$

$f(x) = a * x^5 + b*x^3 + c*x$

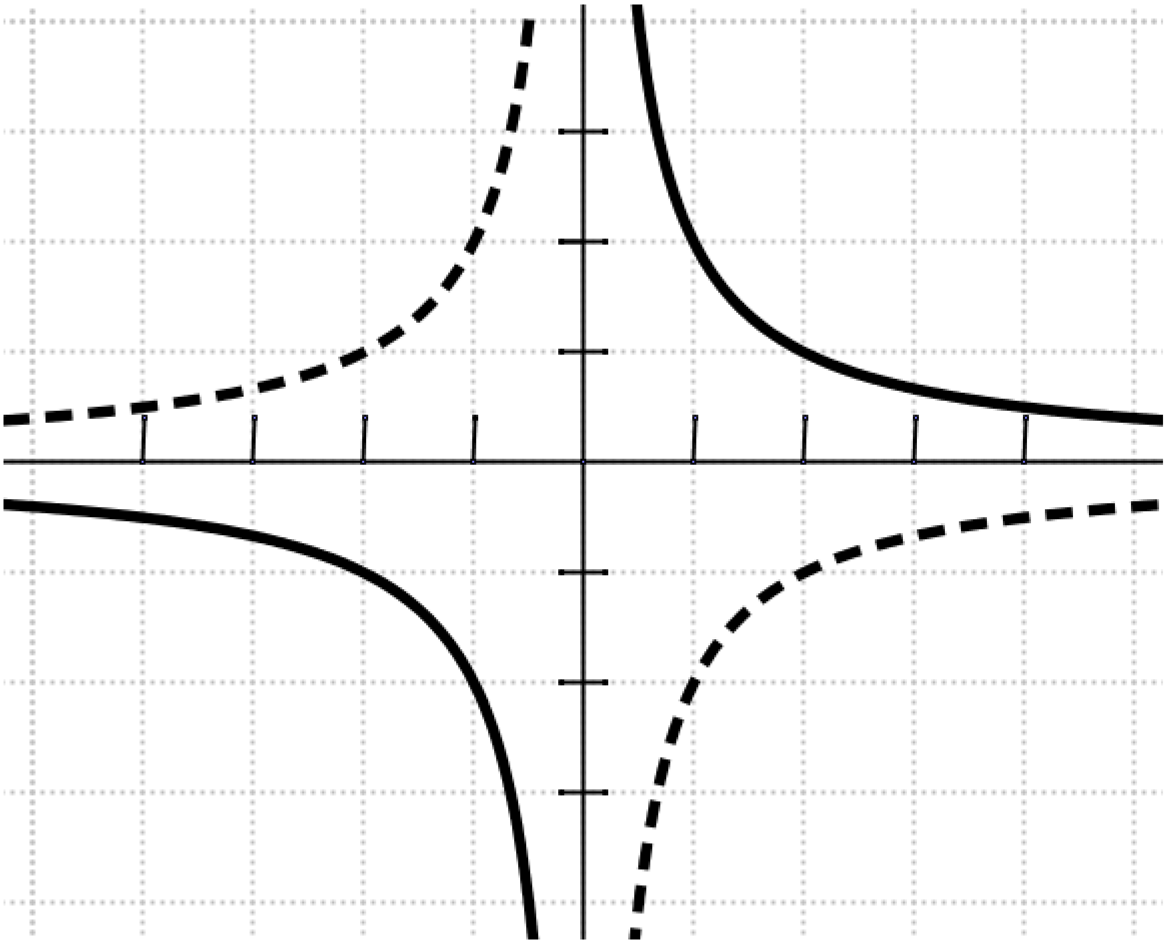




f_gebr1.1: f(x) =a/x

a >0 mit (1|a)

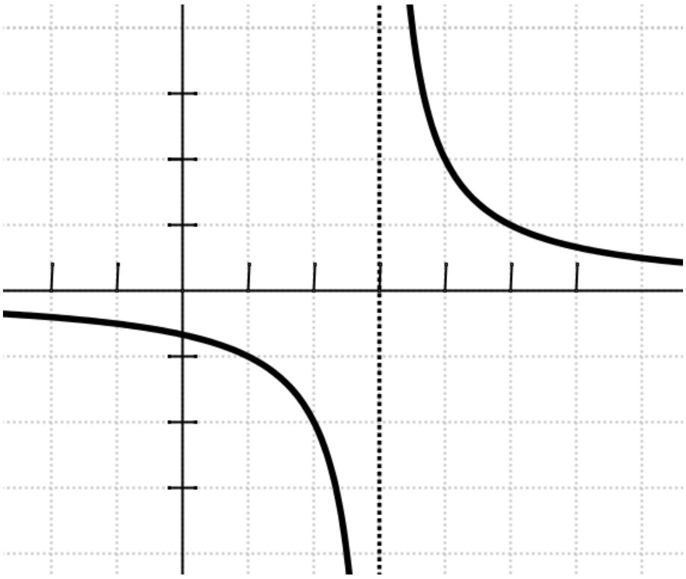
a <0 mit (-1|a)

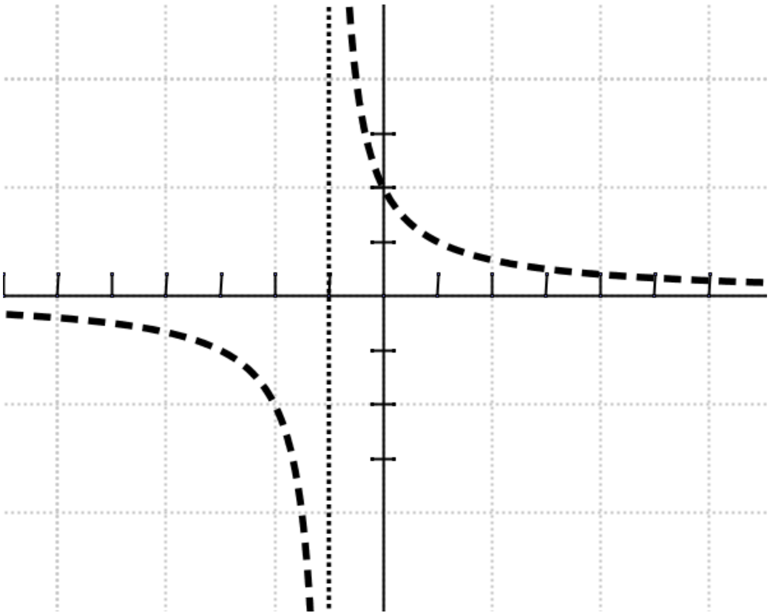


f_gebr1.2: f(x) =a/(x +b)

a >0, b<0

a >0, b >0

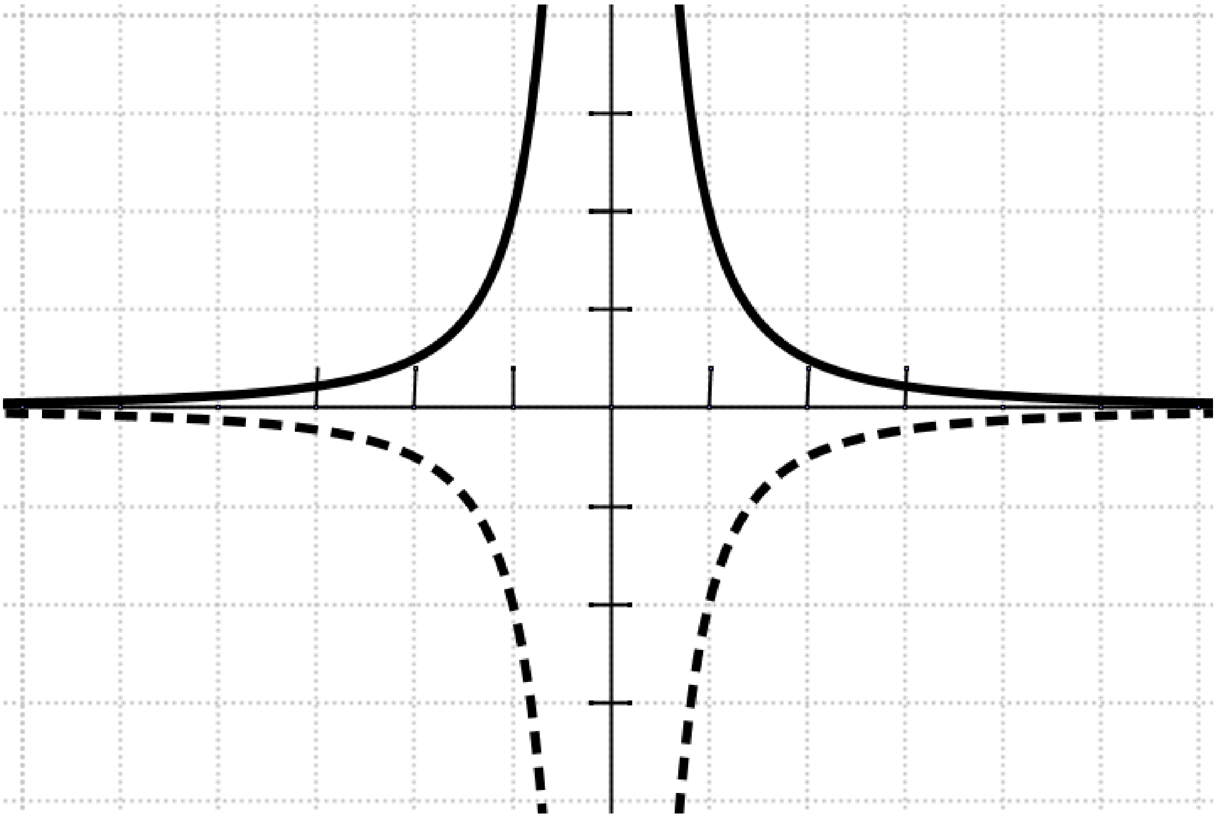




f_gebr2.1: f(x) =a/x^2

a >0:

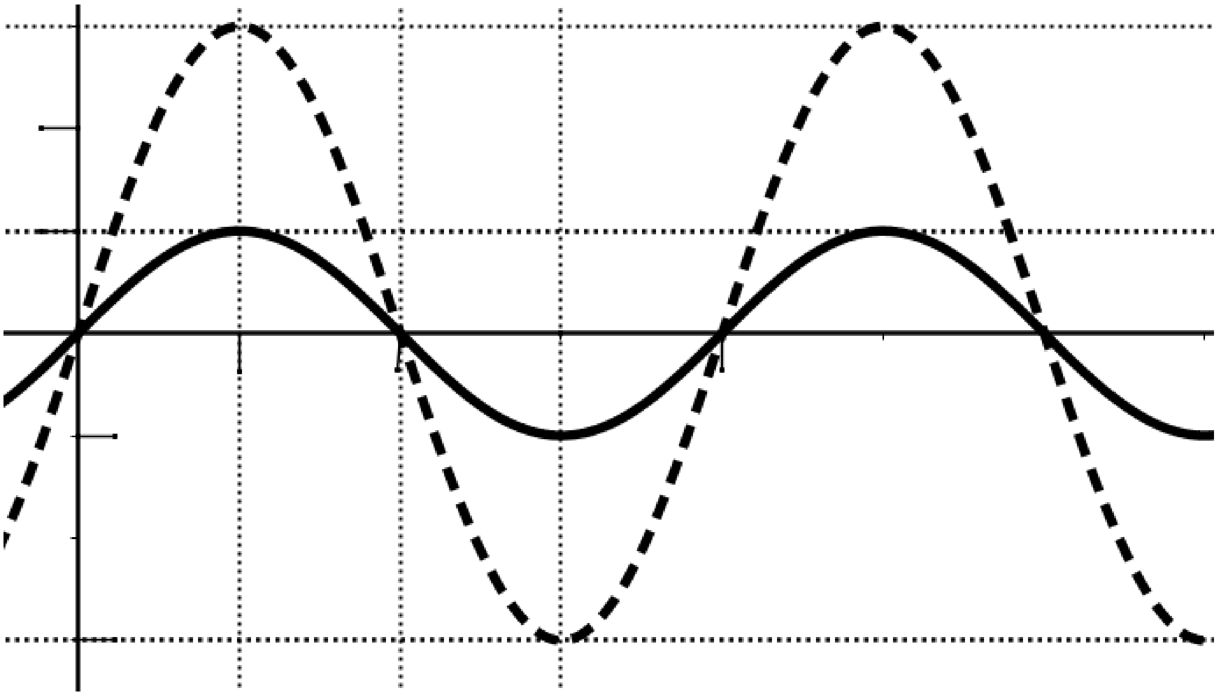
a <0:



f_sin.1: f(x) =a *sin(x)

a =1:

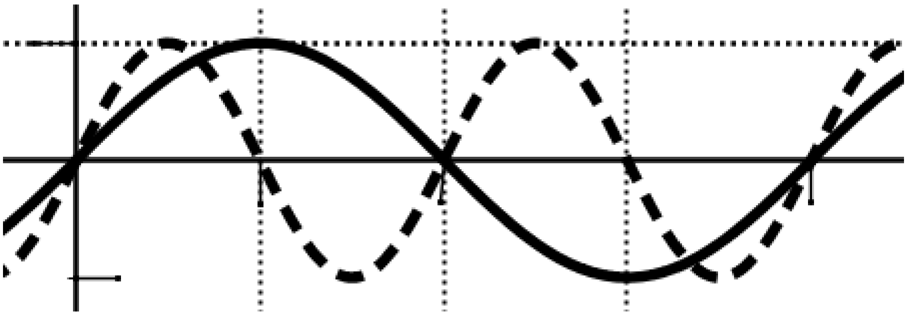
a =3:



f_sin.2: f(x) =sin(b *x)

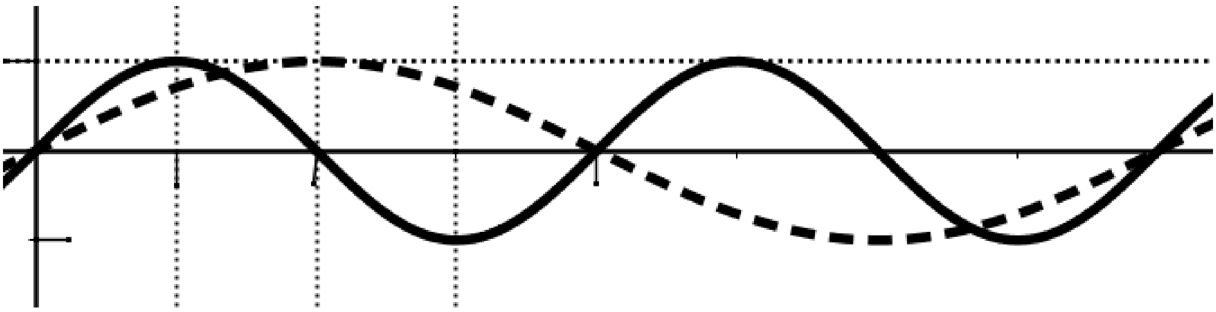
b =1: ———

b =2: - - - -



b =1: ———

b =1/2: - - - -



EK

P('cos('al)|'sin('al)) •