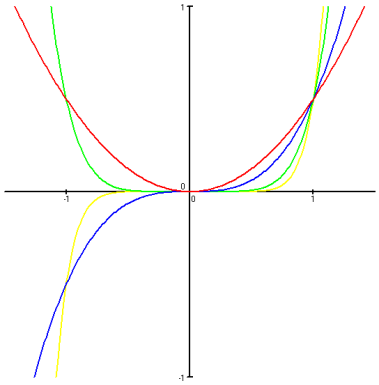
Hoofdstuk 10: Allerlei functies

10.1 Machtsfuncties

Opgave 1:

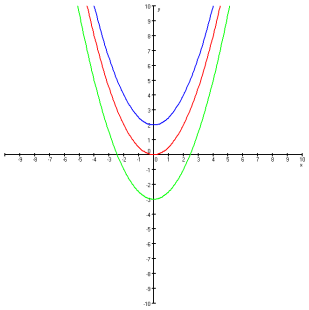
a. 

b. $(0,0)$ en $(1,\frac{1}{2})$

c. y_1 en y_3

d. y_1 en y_3

Opgave 2:

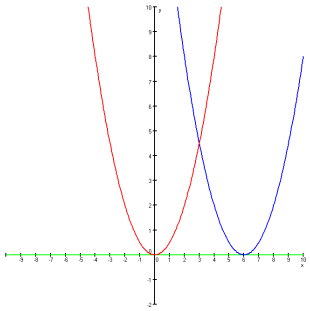
a. 

b. translatie over $(0,2)$

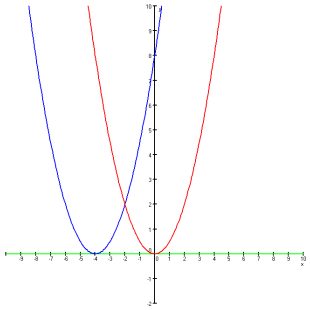
c. translatie over $(0,-3)$

d. als je de grafiek van $y = 0{,}5x^2$ transleert over $(0,6)$ krijgt je de grafiek van $y = 0{,}5x^2 + 6$.

Opgave 3:

a. 

transleer over $(6,0)$

b. 

transleer over $(-4,0)$

c. als je de grafiek van $y = 0{,}5x^2$ transleert over $(2,0)$ krijg je de grafiek van $y = 0{,}5(x-2)^2$.

Opgave 4:

a. $y = -5x^2 \xrightarrow{T(2,5)} y = -5(x-2)^2 + 5$

$y = -5x^2 \xrightarrow{T(-3,6)} y = -5(x+3)^2 + 6$

$y = -5x^2 \xrightarrow{T(7,0)} y = -5(x-7)^2$

b. $y = 4x^5 \xrightarrow{T(-5,7)} y = 4(x+5)^5 + 7$

$y = 4x^5 \xrightarrow{T(0,-10)} y = 4x^5 - 10$

$y = 4x^5 \xrightarrow{T(320,50)} y = 4(x-320)^5 + 50$

Opgave 5:

a. $y = 5x^2 + 1 \xrightarrow{T(4,6)} y = 5(x-4)^2 + 7$

b. $y = (x-6)^3 \xrightarrow{T(4,6)} y = (x-10)^3 + 6$

c. $y = -x^4 + 2 \xrightarrow{T(4,6)} y = -(x-4)^4 + 8$

d. $y = 3(x-5)^6 + 8 \xrightarrow{T(4,6)} y = 3(x-9)^6 + 14$

e. $y = -2(x+4)^5 + 6 \xrightarrow{T(4,6)} y = -2x^5 + 12$

f. $y = -2(x-4)^2 - 6 \xrightarrow{T(4,6)} y = -2(x-8)^2$

Opgave 6:

a. $y = 5x^6 \xrightarrow{T(8,-3)} y = 5(x-8)^6 - 3$

b. $y = -3x^4 + 6 \xrightarrow{T(-4,0)} y = -3(x+4)^4 + 6$

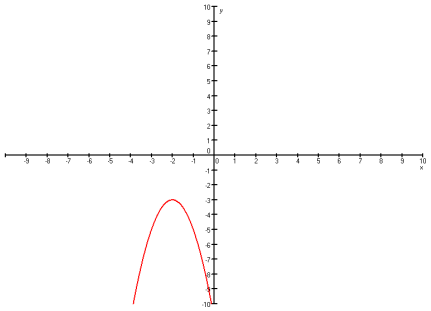
c. $y = 2(x-3)^2 \xrightarrow{T(5,0)} y = 2(x-8)^2$

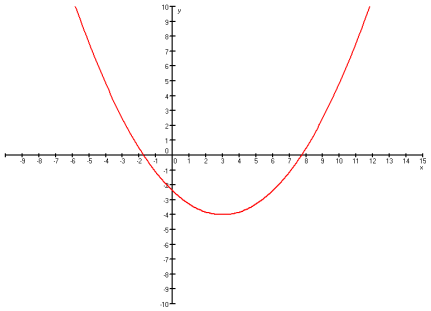
d. $y = -5(x-1)^3 + 8 \xrightarrow{T(2,-7)} y = -5(x-3)^3 + 1$

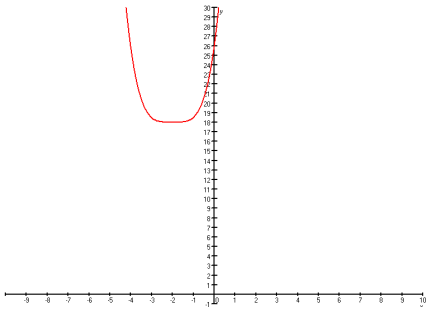
e. $y = x^5 + 6 \xrightarrow{T(-8,-3)} y = (x+8)^5 + 3$

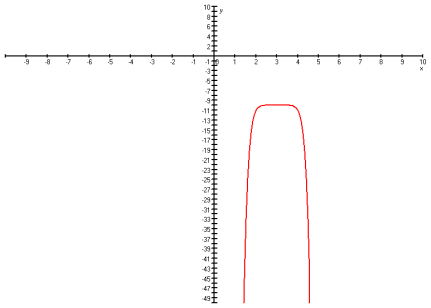
f. $y = -x^4 \xrightarrow{T(7,-8)} y = -(x-7)^4 - 8$

Opgave 7:

a.  max $f(-2) = -3$

b.  min $g(3) = -4$

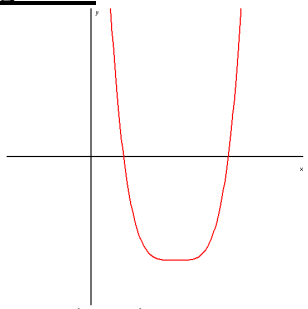
c.  min $h(-2) = 18$

d.  max $k(3) = -10$

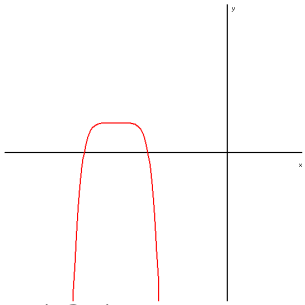
Opgave 8:

a. max $f(5) = 8$
b. min $g(0) = 7$
c. min $h(-8) = 0$
d. min $k(8) = 12$
e. max $l(100) = 0$
f. max $m(-0{,}15) = -0{,}3$

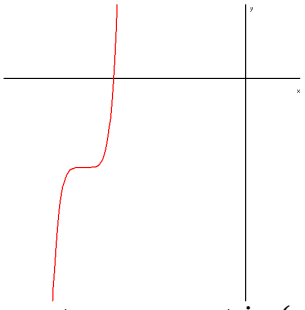
Opgave 9:

a. 

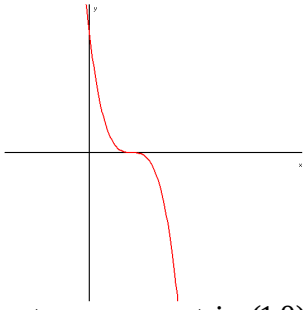
top $(2,-7)$

b. 

top $(-3,2)$

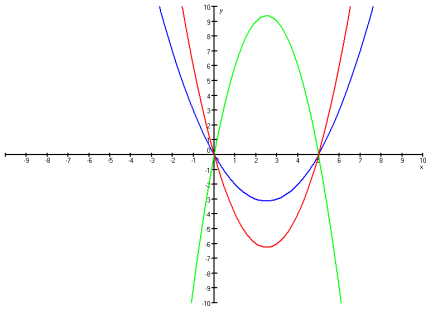
c. 

punt van symmetrie $(-6,-12)$

d. 

punt van symmetrie $(1,0)$

Opgave 10:

a. 

b. vermenigvuldiging ten opzichte van de x-as met factor 0,5.
vermenigvuldiging ten opzichte van de x-as met factor $-1{,}5$.

Opgave 11:

a. $y = 0{,}3x^2 \xrightarrow{T(-5,6)} y = 0{,}3(x+5)^2 + 6 \xrightarrow{V_{x-as,-3}} y = -0{,}9(x+5)^2 - 18$
top $(-5,-18)$

b. $y = 0{,}5x^4 \xrightarrow{V_{x-as,-4}} y = -2x^4 \xrightarrow{T(-3,5)} y = -2(x+3)^4 + 5$
top $(-3,5)$

c. $y = -3x^5 + 4 \xrightarrow{T(2,-7)} y = -3(x-2)^5 - 3 \xrightarrow{V_{x-as,6}} y = -18(x-2)^5 - 18$
punt van symmetrie $(2,-18)$

Opgave 12:

a. $y = -0{,}12x^2 \xrightarrow{T(4,5)} y = -0{,}12(x-4)^2 + 5 \xrightarrow{V_{x-as,4}} y = -0{,}48(x-4)^2 + 20$
top $(4,20)$

b. $y = 5x^4 \xrightarrow{V_{x-as,-2}} y = -10x^4 \xrightarrow{T(6,0)} y = -10(x-6)^4$
top $(6,0)$

c. $y = 3(x-4)^2 - 8 \xrightarrow{T(-5,2)} y = 3(x+1)^2 - 6 \xrightarrow{V_{x-as,-4}} y = -12(x+1)^2 + 24$
top $(-1,24)$

d. $y = -1{,}5(x+3)^3 + 8 \xrightarrow{V_{x-as,-2}} y = 3(x+3)^3 - 16 \xrightarrow{T(8,20)} y = 3(x-5)^3 + 4$
punt van symmetrie $(5,4)$

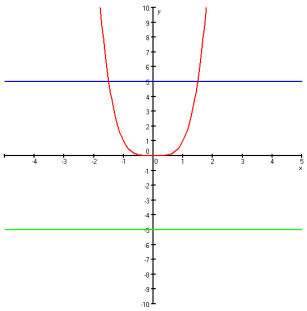
Opgave 13:

a. $V_{x-as,-1}$

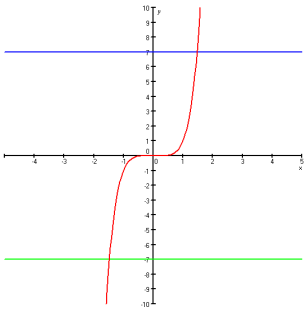
b. $y = 3(x-1)^2 - 6 \xrightarrow{S_{x-as}} y = -3(x-1)^2 + 6$

Opgave 14:

a. twee oplossingen
geen oplossing



b. één oplossing
één oplossing



Opgave 15:

a. $3x^6 - 1 = 5$
$3x^6 = 6$
$x^6 = 2$
$x = \sqrt[6]{2} \quad \vee \quad x = -\sqrt[6]{2}$

b. $\frac{1}{3}x^4 + 7 = 11$
$\frac{1}{3}x^4 = 4$
$x^4 = 12$
$x = \sqrt[4]{12} \quad \vee \quad x = -\sqrt[4]{12}$

c. $-2x^5 + 8 = 15$
$-2x^5 = 7$
$x^5 = -3\frac{1}{2}$
$x = \sqrt[5]{-3\frac{1}{2}}$

d. $3x^4 - 7 = 11$
$3x^4 = 18$
$x^4 = 6$
$x = \sqrt[4]{6} \quad \vee \quad x = -\sqrt[4]{6}$

e. $5(2x-1)^6+7=12$

$5(2x-1)^6=5$

$(2x-1)^6=1$

$2x-1=1 \quad \vee \quad 2x-1=-1$

$2x=2 \quad \vee \quad 2x=0$

$x=1 \quad \vee \quad x=0$

f. $-\frac{1}{4}(3x-1)^3+8=10$

$-\frac{1}{4}(3x-1)^3=2$

$(3x-1)^3=-8$

$3x-1=-2$

$3x=-1$

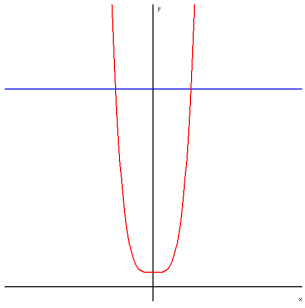
$x=-\frac{1}{3}$

Opgave 16:

a. $y_1=5x^4+1$ en $y_2=14$

intersect geeft $x=-1{,}27 \quad \vee \quad x=1{,}27$

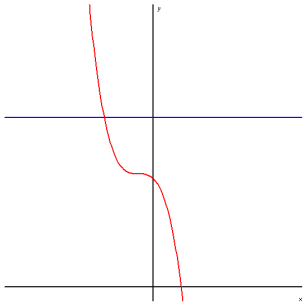
$x<-1{,}27 \quad \vee \quad x>1{,}27$



b. $y_1=-\frac{1}{3}(2x+1)^3+8$ en $y_2=12$

intersect geeft $x=-1{,}64$

$x\le -1{,}64$



Opgave 17:

a. $\frac{1}{5}x^3-7=1$

$\frac{1}{5}x^3=8$

$x^3=40$

$x=\sqrt[3]{40}=3{,}42$

b. $-3x^6+2=20$

$-3x^6=18$

$x^6=-6$

geen oplossingen

c. $3(\frac{1}{2}x+1)^4+5=41$

$3(\frac{1}{2}x+1)^4=36$

$(\frac{1}{2}x+1)^4=12$

$\frac{1}{2}x+1=\sqrt[4]{12}=1{,}86 \quad \vee \quad \frac{1}{2}x+1=-\sqrt[4]{12}=-1{,}86$

$\frac{1}{2}x = 0{,}86 \quad \vee \quad \frac{1}{2}x = -2{,}86$

$x = 1{,}72 \quad \vee \quad x = -5{,}72$

d. $-(x+1)^5 - 1 = 8$

$-(x+1)^5 = 9$

$(x+1)^5 = -9$

$x+1 = \sqrt[5]{-9} = -1{,}55$

$x = -2{,}55$