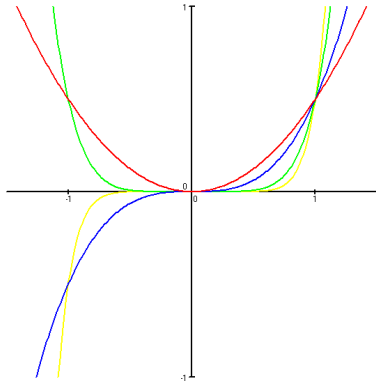


## Hoofdstuk 10: Allerlei functies

### 10.1 Machtsfuncties

#### Opgave 1:

a.



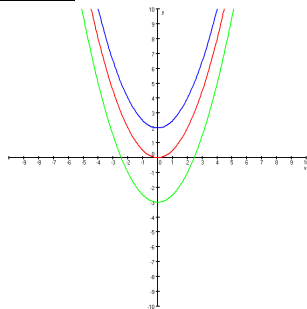
b.  $(0,0)$  en  $(1, \frac{1}{2})$

c.  $y_1$  en  $y_3$

d.  $y_1$  en  $y_3$

#### Opgave 2:

a.



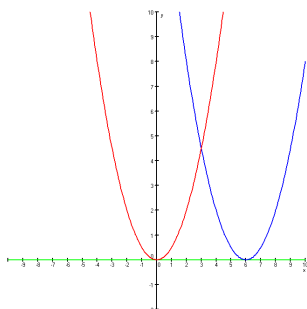
b. translatie over  $(0,2)$

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

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

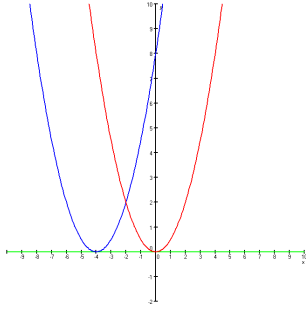
#### Opgave 3:

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:**

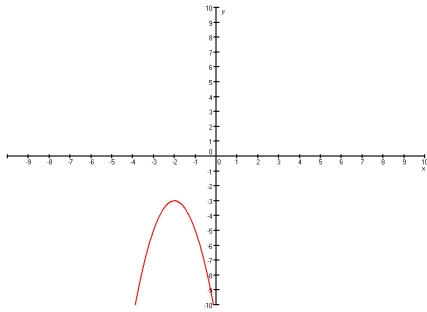
- a.  $y = 5x^2 + 1 \xrightarrow{T(4,6)} y = 5(x - 4)^2 + 7$   
b.  $y = (x - 6)^3 \xrightarrow{T(4,6)} y = (x - 10)^3 + 6$   
c.  $y = -x^4 + 2 \xrightarrow{T(4,6)} y = -(x - 4)^4 + 8$   
d.  $y = 3(x - 5)^6 + 8 \xrightarrow{T(4,6)} y = 3(x - 9)^6 + 14$   
e.  $y = -2(x + 4)^5 + 6 \xrightarrow{T(4,6)} y = -2x^5 + 12$   
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.  $y = -x^4 \xrightarrow{T(7,-8)} y = -(x - 7)^4 - 8$

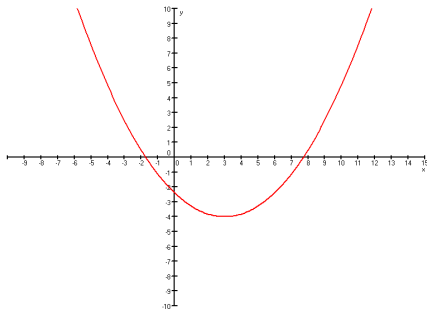
**Opgave 7:**

a.



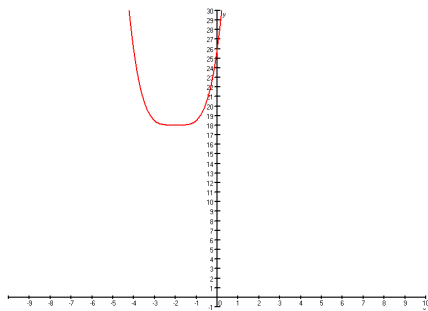
$$\max f(-2) = -3$$

b.



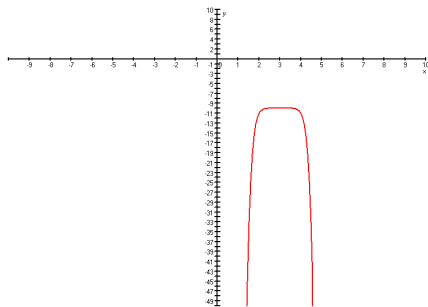
$$\min g(3) = -4$$

c.



$$\min h(-2) = 18$$

d.



$$\max k(3) = -10$$

**Opgave 8:**

a.  $\max f(5) = 8$

b.  $\min g(0) = 7$

c.  $\min h(-8) = 0$

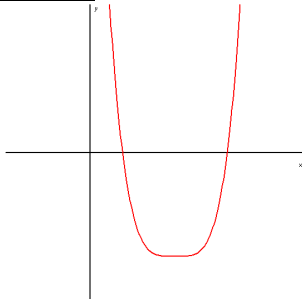
d.  $\min k(8) = 12$

e.  $\max l(100) = 0$

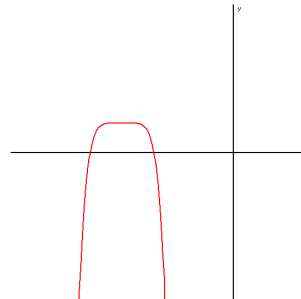
f.  $\max m(-0,15) = -0,3$

**Opgave 9:**

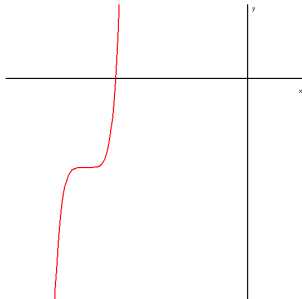
a.

top  $(2, -7)$ 

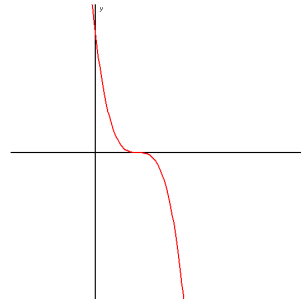
b.

top  $(-3, 2)$ 

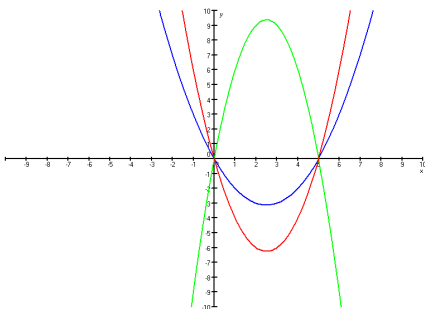
c.

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  $(6, 0)$

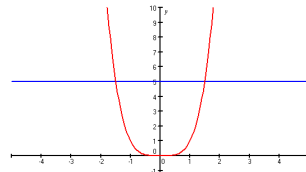
- c.  $y = 3(x-4)^2 - 8 \xrightarrow{T(-5,2)} y = 3(x+1)^2 - 6 \xrightarrow{V_{x-as,-4}} y = -12(x+1)^2 + 24$   
top  $(-1,24)$
- d.  $y = -1,5(x+3)^3 + 8 \xrightarrow{V_{x-as,-2}} y = 3(x+3)^3 - 16 \xrightarrow{T(8,20)} y = 3(x-5)^3 + 4$   
punt van symmetrie  $(5,4)$

**Opgave 13:**

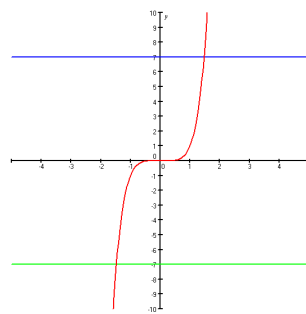
- a.  $V_{x-as,-1}$
- b.  $y = 3(x-1)^2 - 6 \xrightarrow{S_{x-as}} y = -3(x-1)^2 + 6$

**Opgave 14:**

- a. twee oplossingen  
geen oplossing



- b. één oplossing  
één oplossing



**Opgave 15:**

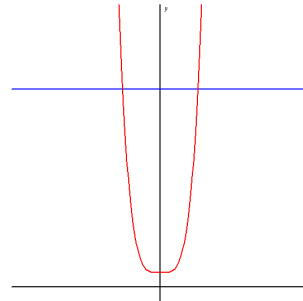
- a.  $3x^6 - 1 = 5$   
 $3x^6 = 6$   
 $x^6 = 2$   
 $x = \sqrt[6]{2} \quad \vee \quad x = -\sqrt[6]{2}$
- b.  $\frac{1}{3}x^4 + 7 = 11$   
 $\frac{1}{3}x^4 = 4$   
 $x^4 = 12$   
 $x = \sqrt[4]{12} \quad \vee \quad x = -\sqrt[4]{12}$
- c.  $-2x^5 + 8 = 15$   
 $-2x^5 = 7$   
 $x^5 = -3\frac{1}{2}$   
 $x = \sqrt[5]{-3\frac{1}{2}}$
- d.  $3x^4 - 7 = 11$   
 $3x^4 = 18$   
 $x^4 = 6$   
 $x = \sqrt[4]{6} \quad \vee \quad x = -\sqrt[4]{6}$

e.  $5(2x-1)^6 + 7 = 12$   
 $5(2x-1)^6 = 5$   
 $(2x-1)^6 = 1$   
 $2x-1 = 1 \quad \vee \quad 2x-1 = -1$   
 $2x = 2 \quad \vee \quad 2x = 0$   
 $x = 1 \quad \vee \quad x = 0$

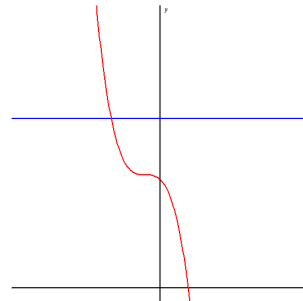
f.  $-\frac{1}{4}(3x-1)^3 + 8 = 10$   
 $-\frac{1}{4}(3x-1)^3 = 2$   
 $(3x-1)^3 = -8$   
 $3x-1 = -2$   
 $3x = -1$   
 $x = -\frac{1}{3}$

**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  $x = -1,64$   
 $x \leq -1,64$



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

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

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

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

$$x = -2,55$$