



① a) $3x^4 - 1 = 242$
 $3x^4 = 243$
 $x^4 = 81$
 $x = -\sqrt[4]{81} \vee x = \sqrt[4]{81}$
 $x = -3 \vee x = 3$

b) $5(2x-1)^6 + 7 = 12$
 $5(2x-1)^6 = 5$
 $(2x-1)^6 = 1$
 $2x-1 = -\sqrt[6]{1} \vee 2x-1 = \sqrt[6]{1}$
 $2x-1 = -1 \vee 2x-1 = 1$
 $2x = 0 \vee 2x = 2$
 $x = 0 \vee x = 1$

c) $\sqrt{2x-1} = 4$
 $2x-1 = 16$
 $2x = 17$
 $x = 8\frac{1}{2}$ voldoet

d) $6 + 5\sqrt{3x-6} = 51$
 $5\sqrt{3x-6} = 45$
 $\sqrt{3x-6} = 9$
 $3x-6 = 81$
 $3x = 87$
 $x = 29$ voldoet

e) $\frac{3}{2x-1} = \frac{2}{x+3}$
 $2(2x-1) = 3(x+3)$
 $4x-2 = 3x+9$
 $x = 11$ voldoet

f) $\frac{2x+4}{x-1} = x$
 $x(x-1) = 2x+4$
 $x^2 - x = 2x+4$
 $x^2 - 3x - 4 = 0$
 $(x^2 - 4)(x+1) = 0$
 $x = 4 \vee x = -1$
voldoet voldoet

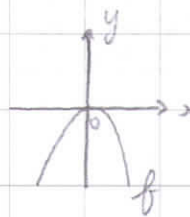
g) $2^{x+1} = 64$
 $2^{x+1} = 2^6$
 $x+1 = 6$
 $x = 5$

h) $3 \cdot 5^{2x+1} = 75\sqrt{5}$
 $5^{2x+1} = 25\sqrt{5}$
 $5^{2x+1} = 5^2 \cdot 5^{\frac{1}{2}}$
 $5^{2x+1} = 5^{2\frac{1}{2}}$
 $2x+1 = 2\frac{1}{2}$
 $2x = 1\frac{1}{2}$
 $x = \frac{3}{4}$

② a) $f(x) = -x^2$

$D_f = \langle \leftarrow, \rightarrow \rangle$

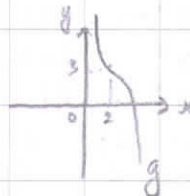
$B_f = \langle \leftarrow, 0 \rangle$, want sketch:



b) $g(x) = (2-x)^5 + 3$

$D_g = \langle \leftarrow, \rightarrow \rangle$

$B_g = \langle \leftarrow, \rightarrow \rangle$, want sketch:



c) $h(x) = \sqrt{x+1}$

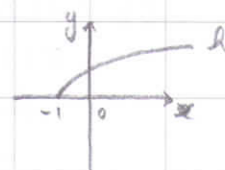
$x+1 \geq 0$

$x \geq -1$, dus $D_h = [-1, \rightarrow \rangle$

$x+1 = 0$

$x = -1$

$h(-1) = 0 \rightarrow$ samen met sketch: $B_h = [0, \rightarrow \rangle$



d) $i(x) = -0,1\sqrt{8-4x} - 2$

$8-4x \geq 0$

$-4x \geq -8$

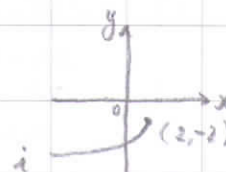
$x \leq 2$, dus $D_i = \langle \leftarrow, 2 \rangle$

$8-4x = 0$

$-4x = -8$

$x = 2$

$i(2) = -2 \rightarrow$ samen met sketch: $B_i = \langle \leftarrow, -2 \rangle$

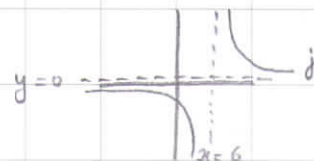


e) $j(x) = \frac{1}{x-6}$

$x-6 \neq 0$

$x \neq 6$, dus $D_j = \langle \leftarrow, 6 \rangle \cup \langle 6, \rightarrow \rangle$ (verticale asymptoot: $x=6$)

$j(1 \text{ mln}) \approx 0$ (horizontale asymptoot: $y=0$), dus $B_j = \langle \leftarrow, 0 \rangle \cup \langle 0, \rightarrow \rangle$



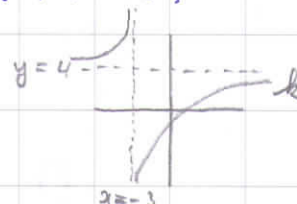
f) $k(x) = \frac{3x-4}{2x+6}$

$2x+6 \neq 0$

$2x \neq -6$

$x \neq -3$, dus $D_k = \langle \leftarrow, -3 \rangle \cup \langle -3, \rightarrow \rangle$ (v.a. $x=-3$)

$k(1 \text{ mln}) \approx \frac{3}{2} = 1,5$ (H.A. $y=1,5$), dus $B_k = \langle \leftarrow, 1,5 \rangle \cup \langle 1,5, \rightarrow \rangle$



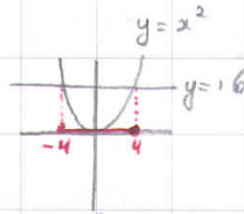


③ a) $x^2 \leq 16$

I HV $x^2 = 16$

$x = -4 \vee x = 4$

II schets



III conclusie

$-4 \leq x \leq 4$

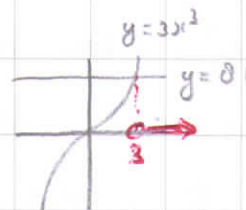
b) ~~$3x^3 > 81$~~

I HV $3x^3 = 81$

$x^3 = 27$

$x = \sqrt[3]{27} = 3$

II schets



III conclusie

$x > 3$

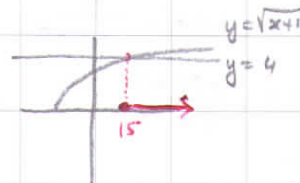
c) $\sqrt{x+1} \geq 4$

I HV $\sqrt{x+1} = 4$

$x+1 = 16$

$x = 15$

II schets



III conclusie

$x \geq 15$

d) $\frac{1}{x+1} < 2$

I HV $\frac{1}{x+1} = 2$

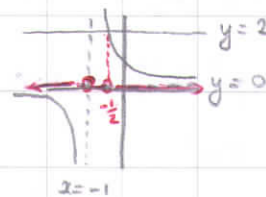
$2(x+1) = 1$

$2x+2 = 1$

$2x = -1$

$x = -\frac{1}{2}$ voldoet

II schets



III conclusie

$x < -1 \vee x > -\frac{1}{2}$

④ a) $f(x) = -3(x-5)^2 + 8$

bergparabool, max. bij (5, 8)

b) $g(x) = 5x^2 + 7$

herschrijven: $g(x) = 5(x-0)^2 + 7$

dalparabool, min. bij (0, 7)

c) $h(x) = -5(x+3)^6 + 2$

max. bij (-3, 2)

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

geen extreme waarde, wel punt van symmetrie bij (1, 0)

e) $l(x) = x^2 + 4x$

$x_{\text{top}} = -\frac{b}{2a} = -\frac{4}{2 \cdot 1} = -2$, $y_{\text{top}} = (-2)^2 + 4 \cdot (-2) = -4$, min. bij (-2, -4)

⑤ a) $y = 5x^6 \xrightarrow{t(8,-3)} y = 5(x-8)^6 - 3$
 b) $y = -x^3 \xrightarrow{t(6,5)} y = -(x-6)^3 + 5$
 c) $y = 3\sqrt{2x} \xrightarrow{t(4,-6)} y = 3\sqrt{2(x-4)} - 6$
 d) $y = \frac{1}{x} \xrightarrow{t(-2,4)} y = \frac{1}{x+2} + 4$

⑥ a) $f(x) = 2^x$, alleen H.A. bij $y=0$
 b) $g(x) = -3^x$, alleen H.A. bij $y=0$
 c) $h(x) = 4 + 0,5^x$, alleen H.A. bij $y=4$
 d) $i(x) = \frac{1}{x}$, H.A. bij $y=0$ en v.A. bij $x=0$
 e) $j(x) = 120 - \frac{4}{x+70}$, H.A. bij $y=120$ en v.A. bij $x=-70$
 f) $k(x) = \frac{10x+3}{5x-4}$, H.A. bij $y=2$ en v.A. bij $x=\frac{4}{5}$

⑦ a) $2a^3 \cdot 4a^7 = 8a^{10}$
 b) $(2a^3)^7 = 2^7 \cdot (a^3)^7 = 128a^{21}$
 c) $\frac{15a^8}{3a^2} = 5a^6$
 d) $21a^6 \cdot \frac{1}{3a} = \frac{21a^6}{3a} = 7a^5$

⑧ a) $\frac{3}{a^2} = 3a^{-2}$
 b) $\frac{a}{a^{12}} = a^{-11}$
 c) $\frac{1}{a^5} : a = \frac{1}{a^5} : \frac{a}{1} = \frac{1}{a^5} \cdot \frac{1}{a} = \frac{1}{a^6} = a^{-6}$
 d) $\frac{4}{\sqrt{a}} = \frac{4}{a^{\frac{1}{2}}} = 4a^{-\frac{1}{2}}$

⑨ a) $y = (\frac{1}{3}x^2)^{-1}x^4 = (\frac{1}{3})^{-1}(x^2)^{-1} \cdot x^4 = 3x^{-2}x^4 = 3x^2$
 b) $y = 75 \cdot (5x)^{-2} \cdot 3x^{12} = 75 \cdot (5)^{-2} \cdot x^{-2} \cdot 3x^{12} = 75 \cdot \frac{1}{25} \cdot 3 \cdot x^{-2} \cdot x^{12} = 9x^{10}$
 c) $y = 50 \cdot 2^{3x-1} = 50 \cdot 2^{3x} \cdot 2^{-1} = 50 \cdot \frac{1}{2} \cdot (2^3)^x = 25 \cdot 8^x$
 d) $y = 275 \cdot 5^{-2x} = 275 \cdot (5^{-2})^x = 275 \cdot (\frac{1}{25})^x$