GEMENGDE OPGAVEN: H2 Functies en grafieken.

Opgave 10:

a. $rc_l = rc_m = -1\frac{1}{2}$ dus $a = -1\frac{1}{2}$

$y = -1\frac{1}{2}x + b$ door $(0,1)$

$1 = 0 + b$ dus $b = 1$

b. snijpunt met de *x*-as van lijn *k*:

$\frac{1}{2}x + 1 = 0$

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

$x = -2$

$l: \quad y = ax - 2$ door $(-2,0)$

$0 = -2a - 2$

$2a = -2$

$a = -1$

$m: \quad y = -1\frac{1}{2}x + b$ door $(-2,0)$

$0 = 3 + b$

$b = -3$

c. $l: \quad y = ax - 2$ door $(4,3)$

$3 = 4a - 2$

$-4a = -5$

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

$m: \quad y = -1\frac{1}{2}x + b$ door $(4,3)$

$3 = -6 + b$

$b = 9$

Opgave 11:

a. $rc = \frac{\Delta B}{\Delta x} = \frac{183{,}95 - 129{,}14}{265 - 178} = 0{,}63$

$B = 0{,}63x + b$

$183{,}95 = 0{,}63 \cdot 265 + b$

$183{,}95 = 166{,}95 + b$

$17 = b$

$B = 0{,}63x + 17$

b. vastrecht: € 17,-

prijs per m³ water: € 0,63

c. $B = 0{,}63 \cdot 200 + 17 = 143$

d. $0{,}63x + 17 > 250$

$0{,}63x > 233$

$x > 369{,}8$

Dus ze verbruiken minstens 370 m³ water per jaar.

Opgave 12:

a. A: $K = 300 + 120 \cdot 1{,}4 = 468$

B: $K = 400 + 20 \cdot 2{,}4 = 448$

Dus bij 120 km kiezen ze voor maatschappij B

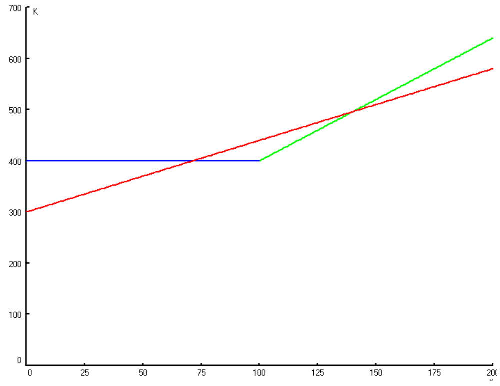
A: $K = 300 + 240 \cdot 1{,}4 = 636$

B: $K = 400 + 140 \cdot 2{,}4 = 736$

Dus bij 240 km kiezen ze voor maatschappij A

b. $K = 300 + 1{,}4x$

c.



d. $\begin{cases} K = 400 & 0 \le x \le 100 \\ K = 400 + 2{,}4(x - 100) & x \ge 100 \end{cases}$

e. $300 + 1{,}4x = 400$ en $300 + 1{,}4x = 400 + 2{,}4(x - 100)$

$1{,}4x = 100$ $\quad$ $300 + 1{,}4x = 400 + 2{,}4x - 240$

$x = 71{,}4$ $\quad$ $-x = -140$

$x = 140$

Opgave 13:

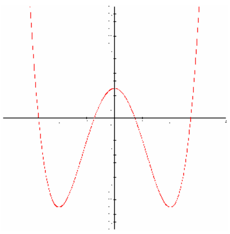
a. $y_1 = x^4 - 8x^2 + 4$

calc-menu optie minimum en maximum geeft:

min $f(-2) = -12$

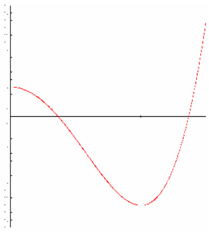
max $f(0) = 4$

min $f(2) = -12$



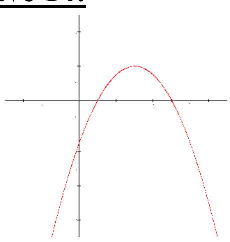
b. $f(3) = 13$

$B_f = [-12, 13]$



Opgave 14:

a.



b. $y_1 = -0{,}5x^2 + 3x - 2{,}5$

calc-menu optie maximum: $x = 3 \quad \wedge \quad y = 2$ dus max $f(3) = 2$

$B_f = \langle \leftarrow, 2]$

c. $T(3,2)$ en $C(0;-2,5)$

$rc = \frac{\Delta y}{\Delta x} = \frac{2--2,5}{3-0} = 1,5$

$y = 1,5x + b$ door $(0;-2,5)$

$-2,5 = b$

lijn TC: $y = 1,5x - 2,5$

d. $-0,5x^2 + 3x - 2,5 = 0$

$x^2 - 6x + 5 = 0$

$(x-1)(x-5) = 0$

$x = 1 \quad \vee \quad x = 5$

$Opp(\Delta ABT) = \frac{1}{2} \cdot 4 \cdot 2 = 4$

Opgave 15:

a. $x_{top} = -\frac{b}{2a} = -\frac{4}{2} = -2$

$y_{top} = f(-2) = 4 - 8 + p = -4 + p$

$-4 + p < 1$

$p < 5$

b. $(-2,-4+p)$ op $y = 3x + 2$

$-4 + p = -6 + 2$

$p = 0$

Opgave 16:

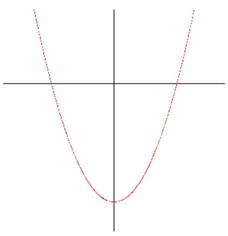
a. de grafiek is een dalparabool en heeft dan geen snijpunten met de x-as, dus $D < 0$.

$D = p^2 - 8 < 0$

$p^2 < 8$

$p = \sqrt{8} \quad \vee \quad p = -\sqrt{8}$

$-\sqrt{8} < x < \sqrt{8}$



b. $x_{top} = -\frac{b}{2a} = -\frac{p}{1} = -p$

$y_{top} = f(-p) = \frac{1}{2}(-p)^2 + p \cdot -p + 4 = \frac{1}{2}p^2 - p^2 + 4 = -\frac{1}{2}p^2 + 4$

$-\frac{1}{2}p^2 + 4 = -5$

$-\frac{1}{2}p^2 = -9$

$p^2 = 18$

$p = \sqrt{18} \quad \vee \quad p = -\sqrt{18}$

c. $-\frac{1}{2}p^2 + 4 = -3 \cdot -p + 8$

$-\frac{1}{2}p^2 + 4 = 3p + 8$

$-\frac{1}{2}p^2 - 3p - 4 = 0$

$p^2 + 6p + 8 = 0$

$(p+2)(p+4) = 0$

$p = -2 \quad \vee \quad p = -4$

Opgave 17:

$x_{top} = -\frac{b}{2a} = -\frac{2p}{2} = -p$ dus $p = -x_{top}$

$y_{top} = f(x_{top}) = (-p)^2 + 2p \cdot -p + \frac{5}{p} = p^2 - 2p^2 + \frac{5}{p} = -p^2 + \frac{5}{p}$

$y_{top} = -(-x_{top})^2 + \frac{5}{-x_{top}} = -(x_{top})^2 - \frac{5}{x_{top}}$

dus alle toppen liggen op de kromme: $y = -x^2 - \frac{5}{x}$

Opgave 18:

a. de top van *f* is het punt $(-2,4)$

$(-2,4) \xrightarrow{V_{x-as,2}} (-2,8) \xrightarrow{T(-2,-1)} (-4,7)$

b. $(-2,4) \xrightarrow{V_{x-as,4}} (-2,16) \xrightarrow{T(a,b)} (-2+a, 16+b)$

$-2 + a = 3$ dus $a = 5$

$16 + b = 5$ dus $b = -11$

c. $(-2,4) \xrightarrow{T(2,-6)} (0,-2) \xrightarrow{V_{x-as,c}} (0,-2c)$

Opgave 19:

a. $g(x) = 0{,}25(x+2)^2 - 4 + q$

$g(0) = 1 - 4 + q = 0$

$q = 3$

b. $h(x) = 0{,}25(x - p + 2)^2 - 4$

$h(0) = 0{,}25(-p+2)^2 - 4 = 0$

$0{,}25(-p+2)^2 = 4$

$(-p+2)^2 = 16$

$-p + 2 = 4 \quad \vee \quad -p + 2 = -4$

$-p = 2 \quad \vee \quad -p = -6$

$p = -2 \quad \vee \quad p = 6$

c. $B_f = [-4, \rightarrow\rangle$

$B_k = \langle \leftarrow, 6]$

$-4 \cdot a = 6$

$a = -1\frac{1}{2}$

d. $f(0) = -3$ en de top is $(-2,-4)$

$\begin{cases} m(-2) = 16a + b = -4 \\ m(0) = b = -3 \end{cases}$

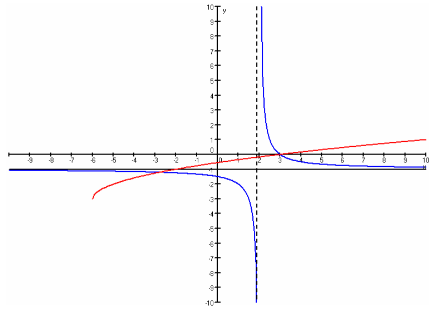
$16a - 3 = -4$

$16a = -1$

$a = -\frac{1}{16}$

Opgave 20:

a.



b. $y_1 = \sqrt{x+6} - 3$ en $y_2 = \dfrac{1}{x-2} - 1$

calc-menu intersection geeft: $x = -2{,}79 \quad \vee \quad x = 3$

$-6 \le x \le -2{,}79 \quad \vee \quad 2 < x \le 3$

c. $\sqrt{x+6} - 3 = 1$

$\sqrt{x+6} = 4$

$x + 6 = 16$

$x = 10$

d. $\dfrac{1}{x-2} - 1 = 5$

$\dfrac{1}{x-2} = 6$

$x - 2 = \frac{1}{6}$

$x = 2\frac{1}{6}$