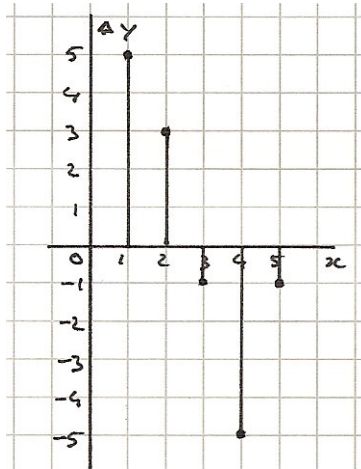


HOOFDSTUK 3: De afgeleide functie.

3.6 Diagnostische toets

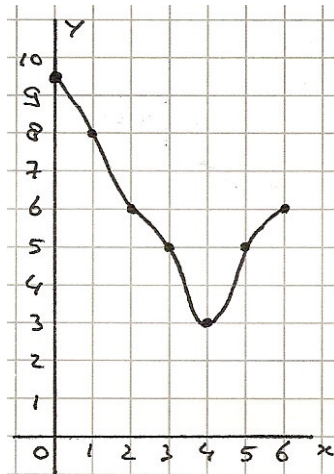
Opgave 1:

x	y	Δy
0	1	-
1	6	5
2	9	3
3	8	-1
4	3	-5
5	2	-1



Opgave 2:

x	Δy	y
0		$9\frac{1}{2}$
1	$-1\frac{1}{2}$	8
2	-2	6
3	-1	5
4	-2	3
5	2	5
6	1	6



Opgave 3:

a.
$$\frac{\Delta y}{\Delta x} = \frac{y(2) - y(0)}{2 - 0} = \frac{9 - 1}{2} = 4$$

b.
$$\frac{\Delta y}{\Delta x} = \frac{y(4) - y(2)}{4 - 2} = \frac{3 - 9}{2} = -3$$

Opgave 4:

a.
$$\frac{\Delta s}{\Delta t} = \frac{s(30) - s(10)}{30 - 10} = \frac{30 - 7}{20} = \frac{23}{20} = 1,15 \text{ m/s} = 69 \text{ km/uur}$$

- b. Teken de lijn door de punten (0,0) en (7,5;6). Waar deze lijn de grafiek nogmaals snijdt, is het gevraagde punt. Dus voor $t = 17,5$.

Opgave 5:

a.
$$\frac{\Delta y}{\Delta x} = \frac{f(4) - f(1)}{4 - 1} = \frac{8 - -2,5}{3} = 3,5$$

b. $\frac{\Delta y}{\Delta x} = \frac{f(1) - f(-1)}{1 - (-1)} = \frac{-2,5 - 0,5}{2} = -1,5$

c. $y_A = f(-2) = -4$
 $y_B = f(3) = -1,5$
 $rc = \frac{\Delta y}{\Delta x} = \frac{y_B - y_A}{x_B - x_A} = \frac{-1,5 - (-4)}{3 - (-2)} = \frac{2,5}{5} = 0,5$
 $y = 0,5x + b$ door $(-2, -4)$
 $-4 = -1 + b$
 $b = -3$
 $l: y = 0,5x - 3$

Opgave 6:

a. $y_1 = \sqrt{2x - 3}$ calcmenu optie 6 geeft $\left[\frac{dy}{dx} \right]_{x=2} = 1$

b. calcmenu optie 6 geeft $\left[\frac{dy}{dx} \right]_{x=3,5} = 0,5$

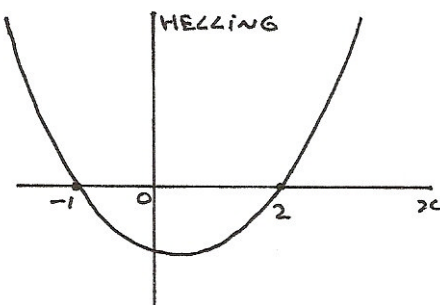
c. $y_B = f(6) = 3$
 $rc = \left[\frac{dy}{dx} \right]_{x=6} = \frac{1}{3}$
 $y = \frac{1}{3}x + b$ y door $(6, 3)$
 $3 = 2 + b$
 $b = 1$
 $k: y = \frac{1}{3}x + 1$

Opgave 7:

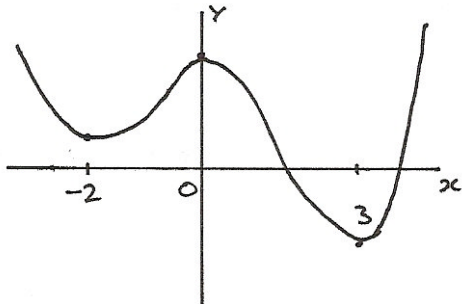
a. $y_1 = -0,25x^3 + 3x^2$ calcmenu optie 6 geeft $\left[\frac{dy}{dx} \right]_{x=2} = 9$
dus $v(2) = 9 \text{ m/s}$

b. calcmenu optie 6 geeft $\left[\frac{dy}{dx} \right]_{x=6} = 9$
dus $v(6) = 9 \text{ m/s}$
 $s(6) = 54$
 $s(10) = 54 + 4 \cdot 9 = 90 \text{ m}$

Opgave 8:

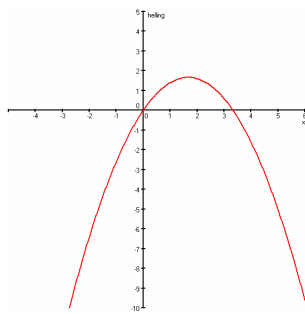


Opgave 9:

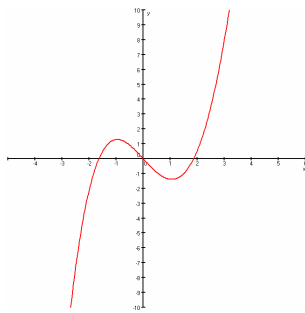


Opgave 10:

a.



b.



Opgave 11:

a. $f'(3) = \lim_{h \rightarrow 0} \frac{f(3+h) - f(3)}{h} =$

$$\lim_{h \rightarrow 0} \frac{5(3+h)^2 + 4 - 49}{h} =$$

$$\lim_{h \rightarrow 0} \frac{5(9 + 6h + h^2) - 45}{h} =$$

$$\lim_{h \rightarrow 0} \frac{45 + 30h + 5h^2 - 45}{h} =$$

$$\lim_{h \rightarrow 0} \frac{30h + 5h^2}{h} =$$

$$\lim_{h \rightarrow 0} (30 + 5h) = 30 + 0 = 30$$

b. $f'(10) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} =$

$$\lim_{h \rightarrow 0} \frac{5(x+h)^2 + 4 - (5x^2 + 4)}{h} =$$

$$\lim_{h \rightarrow 0} \frac{5(x^2 + 2hx + h^2) + 4 - 5x^2 - 4}{h} =$$

$$\lim_{h \rightarrow 0} \frac{5x^2 + 10hx + 5h^2 - 5x^2}{h} =$$

$$\lim_{h \rightarrow 0} \frac{10hx + 5h^2}{h} =$$

$$\lim_{h \rightarrow 0} (10x + 5h) = 10x + 0 = 10x$$

Opgave 12:

- a. $f'(x) = 1,8x^2 - 2,6x$
 b. $g'(p) = 12p^2 + 2p - 11$

Opgave 13:

- a. $f(x) = (3-x)(5+2x) = 15 + 6x - 5x - 2x^2 = -2x^2 + x + 15$
 $f'(x) = -4x + 1$
 b. $g(x) = (3x+1)^2 = 9x^2 + 6x + 1$
 $g'(x) = 18x + 6$
 c. $h(x) = x(2x-1)^2 = x(4x^2 - 4x + 1) = 4x^3 - 4x^2 + x$
 $h'(x) = 12x^2 - 8x + 1$
 d. $k(x) = \frac{1}{3}x^3 + 2x^2(x-4) + 6 = \frac{1}{3}x^3 + 2x^3 - 8x^2 + 6 = 2\frac{1}{3}x^3 - 8x^2 + 6$
 $k'(x) = 7x^2 - 16x$

Opgave 14:

- a. $y_A = f(5) = -3$
 $f'(x) = 0,6x^2 - 6$
 $rc = f'(5) = 9$
 $y = 9x + b$ door $(5, -3)$
 $-3 = 45 + b$
 $b = -48$
 $m: y = 9x - 48$
 b. $y_B = f(0) = 2$
 $rc = f'(0) = -6$
 $y = -6x + b$ door $(0, 2)$
 $2 = b$
 $k: y = -6x + 2$

Opgave 15:

- a. $y_A = f(2) = 9\frac{2}{3}$
 $f'(x) = -\frac{1}{2}x^2 + x + 4$
 $rc = f'(2) = 4$
 $y = 4x + b$ door $(2, 9\frac{2}{3})$
 $9\frac{2}{3} = 8 + b$

$$b = 1\frac{2}{3}$$

$$k: y = 4x + 1\frac{2}{3}$$

b. $rc_m = rc_k = 4$

$$f'(x) = -\frac{1}{2}x^2 + x + 4 = 4$$

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

$$-\frac{1}{2}x(x-2) = 0$$

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

$$y_B = f(0) = 1$$

$$B(0,1)$$

c. $rc = f'(x) = -\frac{1}{2}x^2 + x + 4 = 0$

$$x^2 - 2x - 8 = 0$$

$$(x-4)(x+2) = 0$$

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

$$y = 14\frac{1}{3} \quad \vee \quad y = -3\frac{2}{3}$$

$$(4, 14\frac{1}{3}) \text{ en } (-2, -3\frac{2}{3})$$

Opgave 16:

a. $v(t) = h'(t) = -10t + 30$

$$v(2) = h'(2) = 10 \text{ m/s}$$

b. $h'(t) = -10t + 30 = -5$

$$-10t = -35$$

$$t = 3,5$$

c. $h(t) = -5t^2 + 30t + 1,5 = 0$

$$y_1 = -5x^2 + 30x + 1,5 \text{ calcmenu optie zero geeft } x = 6,05$$

$$t = 6,05$$

$$h'(6,05) = -30,5 \text{ m/s}$$