



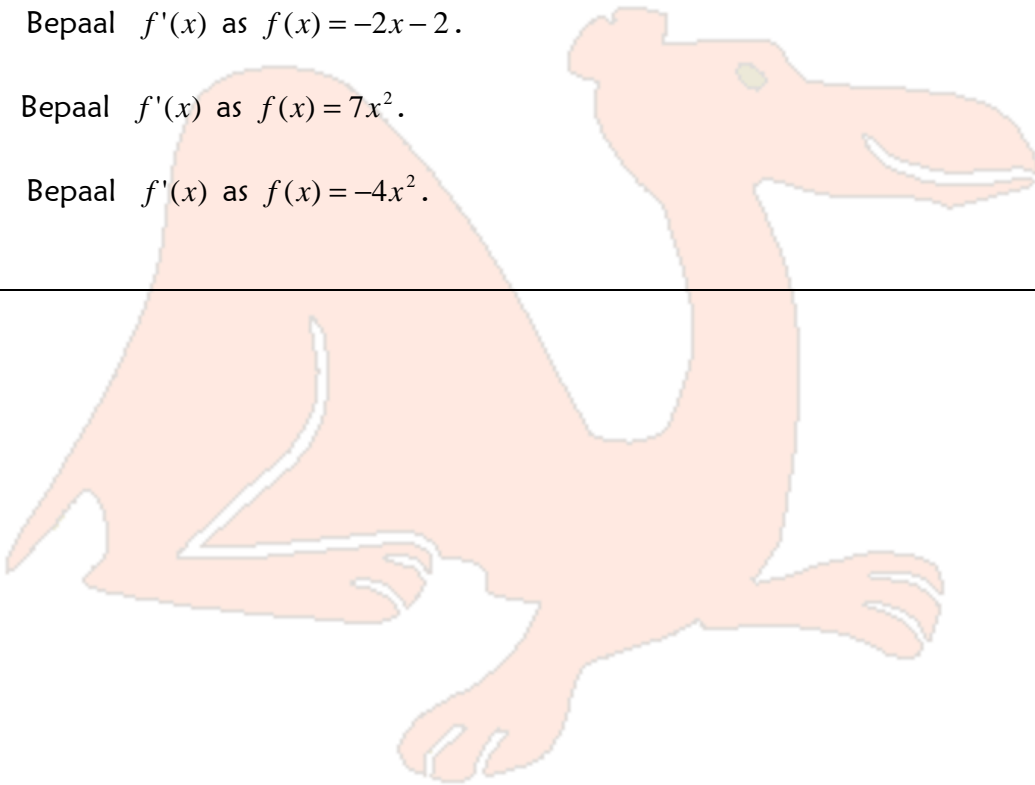
CAMI Wiskunde: Graad 12

12.5 Differentiaal rekene

12.5 Eerste beginsels

1. Afgeleides met behulp van eerste beginsels.

- (a) Bepaal $f'(x)$ as $f(x) = 8x - 7$.
- (b) Bepaal $f'(x)$ as $f(x) = -1$.
- (c) Bepaal $f'(x)$ as $f(x) = -7x + 7$.
- (d) Bepaal $f'(x)$ as $f(x) = 4x + 7$.
- (e) Bepaal $f'(x)$ as $f(x) = -2x - 2$.
- (f) Bepaal $f'(x)$ as $f(x) = 7x^2$.
- (g) Bepaal $f'(x)$ as $f(x) = -4x^2$.





MEMO

1. Afgeleides met behulp van eerste beginsels. [5.6.4.1; 5.6.4.2]

(a) $f(x) = 8x - 7$
 $f(x+h) = 8(x+h) - 7 = 8x + 8h - 7$

$$f'(x) = \lim_{h \rightarrow 0} \frac{8x + 8h - 7 - (8x - 7)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{8h}{h}$$

$$f'(x) = 8$$

(b) $f(x) = -1$
 $f(x+h) = -1$

$$f'(x) = \lim_{h \rightarrow 0} \frac{-1 - 1}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{0}{h}$$

$$f'(x) = 0$$

(c) $f(x) = -7x + 7$
 $f(x+h) = -7(x+h) + 7 = -7x - 7h + 7$

$$f'(x) = \lim_{h \rightarrow 0} \frac{-7x - 7h + 7 - (-7x + 7)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{-7h}{h}$$

$$f'(x) = -7$$

(d) $f(x) = 4x + 7$
 $f(x+h) = 4(x+h) + 7 = 4x + 4h + 7$



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$$f'(x) = \lim_{h \rightarrow 0} \frac{4x + 4h + 7 - (4x + 7)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{4h}{h}$$

$$f'(x) = 4$$

(e) $f(x) = -2x - 2$

$$f(x+h) = -2(x+h) - 2 = -2x - 2h - 2$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{-2x - 2h - 2 - (-2x - 2)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{-2h}{h}$$

$$f'(x) = -2$$

(f) $f(x) = 7x^2$

$$f(x+h) = 7(x+h)^2 = 7(x^2 + 2xh + h^2) = 7x^2 + 14xh + 7h^2$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{7x^2 + 14xh + 7h^2 - (7x^2)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{14xh + 7h^2}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{h(14x + 7h)}{h}$$

$$f'(x) = 14x$$

(g) $f(x) = -4x^2$

$$f(x+h) = -4(x+h)^2 = -4(x^2 + 2xh + h^2) = -4x^2 - 8xh - 4h^2$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{-4x^2 - 8xh - 4h^2 - (-4x^2)}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{-8xh - 4h^2}{h}$$

$$f'(x) = \lim_{h \rightarrow 0} \frac{h(-8x - 4h)}{h}$$

$$f'(x) = -8x$$