Oefeningen hfst 9

HB p. 215 3+ **oef. 3 p. 215**

d) $f'(x) = D(3x^2-x-4)^{1/2} = \frac{1}{2}(3x^2-x-4)^{-1/2} \cdot D(3x^2-x-4)$

$= \frac{1}{2}(3x^2-x-4)^{-\frac{1}{2}} \cdot (6x-1) = \frac{6x-1}{2\sqrt{3x^2-x-4}}$

e) $D(x^5)^{\frac{1}{4}} = D(x^{\frac{5}{4}}) = \frac{5}{4}x^{\frac{5}{4}-1} = \frac{5}{4}x^{\frac{1}{4}} = \frac{5\sqrt[4]{x}}{4}$

g) OFWEL: $D(\sqrt{x}) + D\left(\frac{1}{\sqrt{x}}\right) = \frac{1}{2\sqrt{x}} + D\left(x^{-\frac{1}{2}}\right) = \frac{1}{2\sqrt{x}} - \frac{1}{2}x^{-\frac{3}{2}}$

$= \frac{1}{2\sqrt{x}} - \frac{1}{2\sqrt{x^3}} = \frac{1}{2\sqrt{x}} - \frac{1}{2x\sqrt{x}} = \frac{x-1}{2x\sqrt{x}}$

OFWEL: $D\left(\frac{x+1}{\sqrt{x}}\right) = \frac{D(x+1)\cdot\sqrt{x} - (x+1)\cdot D(x^{1/2})}{x}$ quotiëntregel

$= \frac{1\cdot\sqrt{x} - (x+1)\cdot\frac{1}{2\sqrt{x}}}{x} = \frac{2x-x-1}{2\sqrt{x}\cdot x} = \frac{x-1}{2x\sqrt{x}}$

of productregel (moeilijker) (handleiding p. 155)

h) $D(x^{-\frac{1}{3}}) = -\frac{1}{3}x^{-\frac{4}{3}}\cdot 1 = \frac{-1}{3\sqrt[3]{x^4}} = \frac{-1}{3\sqrt[3]{x^3\cdot x}} = \frac{-1}{3x\sqrt[3]{x}}$

i) $D\left(x^{\frac{3}{2}}\right) = \frac{3}{2}x^{\frac{1}{2}}\cdot 1 = \frac{3}{2}\sqrt{x}$

j) $D(8-3x)^{1/3} = \frac{1}{3}(8-3x)^{-\frac{2}{3}} \cdot D(8-3x) = \frac{1}{\cancel{3}}(8-3x)^{-\frac{2}{3}}\cdot(-\cancel{3})$

$= \frac{-1}{\sqrt[3]{(8-3x)^2}}$

3+ **oef. 4 p. 215**

a) $\lim\limits_{x\to 2}\sqrt{x+7} = \sqrt{\lim\limits_{x\to 2}(x+7)} = \sqrt{9} = 3$

c) $\lim\limits_{x\to+\infty}\sqrt{2x+5} = \sqrt{\lim\limits_{x\to+\infty}(2x+5)} = \sqrt{+\infty} = +\infty$

e) $\lim\limits_{\substack{x\to 4\\ >}}\frac{x-5}{\sqrt{x-4}} = \frac{\lim\limits_{\substack{x\to 4\\ >}}(x-5)}{\lim\limits_{\substack{x\to 4\\ >}}\sqrt{x-4}} = \frac{\lim\limits_{\substack{x\to 4\\ >}}(x-5)}{\sqrt{\lim\limits_{\substack{x\to 4\\ >}}(x-4)}} = \frac{-1}{0} = -\infty$

noemer strikt positief
$x > 4$

3

Als onbepaald zoals $\frac{0}{0}$ → l'Hopital

oef. 5 p. 215

$\lim\limits_{x \to a} \frac{f(x)}{g(x)} = \frac{f'(a)}{g'(a)}$: l'Hopital

a) $\lim\limits_{x \to 4} \frac{\sqrt{x} - 2}{x - 4} \overset{H}{=} \lim\limits_{x \to 4} \frac{\frac{1}{2\sqrt{x}}}{1} = \frac{1}{4}$

c) $\lim\limits_{x \to +\infty} \frac{\sqrt{x} - 1}{x - 1} \overset{H}{=} \lim\limits_{x \to +\infty} \frac{\frac{1}{2\sqrt{x}}}{1} = \frac{1}{+\infty} = 0$

f) $\lim\limits_{x \to -4} \frac{\sqrt[3]{x+12} - 2}{\sqrt{x+5} - 1} \overset{H}{=} \lim\limits_{x \to -4} \frac{\frac{1}{3}(x+12)^{-\frac{2}{3}} \cdot 1 - 0}{\frac{1}{2}(x+5)^{-\frac{1}{2}} \cdot 1} = \frac{\frac{1}{3} \cdot 8^{-\frac{2}{3}}}{\frac{1}{2} \cdot 1} = \frac{\frac{1}{3} \cdot \frac{1}{4}}{\frac{1}{2}} = \frac{1}{6}$