nr 4 p 117 $\quad D\left(\frac{f}{g}\right) = \frac{g\,Df - f\,Dg}{g^2}$

a) $D\left(\frac{x-2}{3-x}\right) = \frac{(3-x)\,D(x-2) - (x-2)\,D(3-x)}{(3-x)^2}$

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

$= \frac{3-x+x-2}{(3-x)^2} = \frac{1}{(3-x)^2}$

b) $D\left(\frac{x^3-2}{x}\right) = \frac{x\cdot D(x^3-2) - (x^3-2)\cdot Dx}{x^2}$

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

$= \frac{3x^3 - x^3 + 2}{x^2} = \frac{2x^3+2}{x^2}$

d) $D\left(\frac{-x^2+2x-1}{x^2-2x}\right) = \frac{(x^2-2x)\cdot D(-x^2+2x-1) - (-x^2+2x-1)\,D(x^2-2x)}{(x^2-2x)^2}$

$(2x-2)$

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

gemeensch. factor vooraf!

$= \frac{(2x-2)\left[-x^2+2x+x^2-2x+1\right]}{(x^2-2x)^2}$

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

e) $D\left(\frac{\sin x}{\cos x - \sin x}\right)$

$$= \frac{(\cos x - \sin x)\cdot D\sin x - \sin x\, D(\cos x - \sin x)}{(\cos x - \sin x)^2}$$

$$= \frac{(\cos x - \sin x)\cos x - \sin x\,(D\cos x - D\sin x)}{(\cos x - \sin x)^2}$$

$$= \frac{(\cos x - \sin x)\cos x - \sin x\,(-\sin x - \cos x)}{(\cos x - \sin x)^2}$$

$$= \frac{\cos^2 x - \sin x\cdot\cos x + \sin^2 x + \sin x\cos x}{(\cos x - \sin x)^2}$$

$$= \frac{\cos^2 x + \sin^2 x}{(\cos x - \sin x)^2} = \boxed{\frac{1}{(\cos x - \sin x)^2}}$$

f) $D\left(\frac{-7}{\cos x}\right) = -7\cdot D\left(\frac{1}{\cos x}\right)$ $\qquad D\left(\frac{1}{f}\right) = -\frac{Df}{f^2}$

$$= -7\cdot\left(-\frac{D\cos x}{\cos^2 x}\right)$$

$$= 7\cdot\frac{-\sin x}{\cos^2 x} = \boxed{-\frac{7\sin x}{\cos^2 x}}$$

g) $D\left(\frac{-3}{4x^2}\right) = -\frac{3}{4}\,Dx^{-2} = -\frac{3}{4}\cdot(-2)\cdot x^{-3}$

$$= \frac{3}{2}\cdot\frac{1}{x^3} = \boxed{\frac{3}{2x^3}}$$

j) $D\left(\frac{\cos x}{2\sin x - 3}\right)$

$= \frac{(2\sin x - 3)\, D\cos x - \cos x\, D(2\sin x - 3)}{(2\sin x - 3)^2}$

$= \frac{(2\sin x - 3).(-\sin x) - \cos x\,(2D\sin x - D3)}{(2\sin x - 3)^2}$

$= \frac{-2\sin^2 x + 3\sin x - \cos x\,(2.\cos x - 0)}{(2\sin x - 3)^2}$

$= \frac{-2\sin^2 x + 3\sin x - 2\cos^2 x}{(2\sin x - 3)^2}$

$= \frac{-2(\sin^2 x + \cos^2 x) + 3\sin x}{(2\sin x - 3)^2} = \frac{-2 + 3\sin x}{(2\sin x - 3)^2}$

k) $D\left(\frac{1}{\cot x}\right) = D\tan x = \frac{1}{\cos^2 x}$

l) $D\left(\frac{x^2 - 2x + 5}{3 + x}\right) = \frac{(3+x).D(x^2 - 2x + 5) - (x^2 - 2x + 5)D(3+x)}{(3+x)^2}$

$= \frac{(3+x).(2x - 2) - (x^2 - 2x + 5).1}{(3+x)^2}$

$= \frac{6x - 6 + 2x^2 - 2x - x^2 + 2x - 5}{(3+x)^2}$

$= \frac{x^2 + 6x - 11}{(3+x)^2}$