nr 5 p 117

a) $D(x^2-2x)^3 = 3(x^2-2x)^2 \cdot D(x^2-2x)$

$x \rightarrow x^2-2x \rightarrow (x^2-2x)^3$ $\qquad = 3(x^2-2x)^2 \cdot (2x-2)$

$Dx^3=3x^2$ $\qquad = 6(x^2-2x)^2 \cdot (x-1)$

b) $D\sin(5x) = \cos(5x) \cdot D5x$

$x \rightarrow 5x \rightarrow \sin(5x)$ $\qquad = \cos(5x) \cdot 5$

$D\sin x=\cos x$ $\qquad = 5\cos(5x)$

c) $D\cos^2 x = 2\cos x \cdot D\cos x$

$x \rightarrow \cos x \rightarrow (\cos x)^2$ $\qquad = 2\cos x \cdot (-\sin x)$

$Dx^2=2x$ $\qquad = -2\sin x \cdot \cos x = -2\sin(2x)$

verdubbelingsformule

d) $D\sqrt{x^2-2x+5} = \frac{1}{2\sqrt{x^2-2x+5}} \cdot D(x^2-2x+5)$

$x \rightarrow x^2-2x+5 \rightarrow \sqrt{x^2-2x+5}$

$D\sqrt{x}=\frac{1}{2\sqrt{x}}$ $\qquad = \frac{2x-2}{2\sqrt{x^2-2x+5}} = \frac{\cancel{2}(x-1)}{\cancel{2}\sqrt{x^2-2x+5}}$

$= \frac{x-1}{\sqrt{x^2-2x+5}}$

h) $D\cos(-4x) = -\sin(-4x) \cdot D(-4x)$

$x \rightarrow -4x \rightarrow \cos(-4x)$ $\qquad = -\sin(-4x) \cdot (-4)$

$D\cos x = -\sin x$ $\qquad \overset{!}{=} \sin 4x \cdot (-4)$ $\qquad \sin(-\alpha) \overset{!}{=} -\sin\alpha$

$= -4\sin 4x$

k) $D\left(\frac{-7}{(2-x)^3}\right) = -7\, D(2-x)^{-3}$ $\qquad x \rightarrow 2-x \rightarrow (2-x)^{-3}$

$Dx^{-3}=-3x^{-4}$

$= -7 \cdot (-3)(2-x)^{-4} \cdot D(2-x) = \frac{21}{(2-x)^4} \cdot (-1) = -\frac{21}{(2-x)^4}$

l) $D \sin\left(3x - \frac{\pi}{4}\right) = \cos\left(3x - \frac{\pi}{4}\right) \cdot D\left(3x - \frac{\pi}{4}\right)$

$x \to 3x - \frac{\pi}{4} \longrightarrow \sin\left(3x - \frac{\pi}{4}\right)$ $\quad = \cos\left(3x - \frac{\pi}{4}\right) \cdot 3$

$D\sin x = \cos x$ $\quad = 3 \cdot \cos\left(3x - \frac{\pi}{4}\right)$

m) $D(\underbrace{\sin 3x}_{f} \cdot \underbrace{\cos 2x}_{g}) = \cos 2x \cdot D\sin 3x + \sin 3x \cdot D\cos 2x$

$x \to 3x \to \sin(3x)$ $\quad$ $D\sin x = \cos x$ $\quad$ $x \to 2x \to \cos 2x$ $\quad$ $D\cos x = -\sin x$

$D(f \cdot g) = g\,Df + f\,Dg$

$= \cos 2x \cdot \cos 3x \cdot D(3x) + \sin 3x(-\sin 2x) \cdot D2x$

$= \cos 2x \cdot \cos 3x \cdot 3 - \sin 3x \cdot \sin 2x \cdot 2$

$= 3\cos 2x \cdot \cos 3x - 2\sin 3x \cdot \sin 2x$

n) $D\left(3x^2 - 2x - 5\right)^4 = 4\left(3x^2 - 2x - 5\right)^3 \cdot D\left(3x^2 - 2x - 5\right)$

$x \to 3x^2 - 2x - 5 \longrightarrow \left(3x^2 - 2x - 5\right)^4$ $\quad = 4\left(3x^2 - 2x - 5\right)^3 \cdot \underbrace{(6x - 2)}_{= 2(3x-1)}$

$Dx^4 = 4x^3$

$= 8\left(3x^2 - 2x - 5\right)^3 \cdot (3x - 1)$