$2\sin x\cos x$

$2(\cos^2 x - \sin^2 x)$

Exer 9C

p. 442

#1-2

1 a.) $y = (2x-1)\cos x$

$\frac{dy}{dx} = 2\cos x + (2x-1)(-\sin x)$

$\boxed{\frac{dy}{dx} = 2\cos x - (2x-1)\sin x}$

b.) $y = (3x - x^2)\sin 2x$

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

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

c.) $y = e^{1-x}\tan x$

$\frac{dy}{dx} = e^{1-x}\cdot(-1)\tan x + e^{1-x}\sec^2 x$

$\boxed{\frac{dy}{dx} = e^{1-x}(\sec^2 x - \tan x)}$

d.) $y = \frac{\sin x}{x}$

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

e.) $y = \frac{2x+3}{\sin 2x}$

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

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

f.) $y = \frac{\tan x}{\sqrt{2-x}}$

$\frac{dy}{dx} = \frac{\sqrt{2-x}\cdot\sec^2 x - \tan x\cdot\frac{1}{2}(2-x)^{-1/2}\cdot(-1)}{(\sqrt{2-x})^2}\cdot\frac{\sqrt{2-x}\cdot 2}{\sqrt{2-x}\cdot 2}$

$\boxed{\frac{dy}{dx} = \frac{(4-2x)\sec^2 x + \tan x}{(4-2x)\sqrt{2-x}}}$

2 a.) $y = \sin 2x$

$\frac{dy}{dx} = 2\cos 2x$

$2\cos\left(\frac{\pi}{3}\right) = \boxed{1}$

b.) $y = \cos 3x$

$\frac{dy}{dx} = -3\sin 3x$

$-3\sin\left(\frac{7\pi}{4}\right) = \boxed{\frac{3\sqrt{2}}{2}}$

$-\frac{\sqrt{2}}{2}$

c.) $y = \tan(-x)$

$\frac{dy}{dx} = -\sec^2(-x)$

135

$-\sec^2\left(-\frac{5\pi}{4}\right) = \boxed{-2}$

$-\frac{\sqrt{2}}{2}$ $\frac{1}{\cos}$

$-c+$

5

$-$

d.) $y = (x-2)\sin x$

$\frac{dy}{dx} = \sin x + (x-2)\cos x$

$\cancel{\sin(0)} + (0-2)\cos 0 = \boxed{-2}$

e.) $y = -3x\cos x$

$\frac{dy}{dx} = -3\cos x + 3x\sin x$

$-3\cancel{\cos\left(\frac{\pi}{2}\right)} + 3\left(\frac{\pi}{2}\right)\sin\left(\frac{\pi}{2}\right) = \boxed{\frac{3\pi}{2}}$

f.) $y = x^2\cdot\tan x$

$\frac{dy}{dx} = 2x\cdot\tan x + x^2\sec^2 x$

$2\left(\frac{3\pi}{4}\right)\tan\left(\frac{3\pi}{4}\right) + \left(\frac{3\pi}{4}\right)^2\sec^2\left(\frac{3\pi}{4}\right) =$

-1

$-\frac{3\pi}{2}$ $\frac{9\pi^2}{16}$ 2

$= -\frac{3\pi}{2} + \frac{9\pi^2}{8}$

$= \boxed{\frac{9\pi^2 - 12\pi}{8}}$

g.) $y = e^x\sec x$

$\frac{dy}{dx} = e^x\sec x + e^x\cdot\sec x\tan x$

$\frac{dy}{dx} = e^x\sec x(1+\tan x)$

$e^0\sec 0(1+\tan 0) = \boxed{1}$

1 1 1

3

9c (cont.) 3 a.) $y = \sin^2 a + \cos^2 a$

p.442 #3

$y = 1$

$\boxed{\frac{dy}{dx} = 0}$

$\boxed{\text{or}}$

$y = \sin^2 a + \cos^2 a$

$\frac{dy}{dx} = 2\sin a\cos a - 2\cos a \sin a$

$\boxed{\frac{dy}{dx} = 0}$

$\frac{3}{2}\sec^2 \frac{2\theta}{2}$

b.) $y = \frac{\sin B}{\cos B} \cdot \frac{1}{\sin B}$ $\quad \sec B$

$\boxed{\frac{dy}{dx} = \sec B \tan B}$

c.) $y = \frac{2\tan 2\theta}{1 - \tan^2 2\theta}$

$y = \tan 2(2\theta)$

$y = \tan 4\theta$

$\boxed{\frac{dy}{d\theta} = 4\sec^2 4\theta}$

d.) $y = \frac{\sin p + \sin 2p}{\cos p + \cos 2p}$

$$\frac{dy}{dx} = \frac{(\cos p + \cos 2p)(\cos p + 2\cos 2p) - (\sin p + \sin 2p)(-\sin p - 2\sin 2p)}{(\cos p + \cos 2p)^2}$$

$+$

$$= \frac{(\cancel{\cos^2 p} + 3\cos p\cos 2p + \cancel{2\cos^2 2p}) + (\cancel{\sin^2 p} + 3\sin p \sin 2p + \cancel{2\sin^2 2p})}{(\cos p + \cos 2p)^2}$$

$\cos(p - 2p) = \cos(-p) = -\cos(p)$

$$= \frac{\overset{1}{(\cancel{\sin^2 p + \cos^2 p})} + 2\overset{1}{(\cancel{\sin^2 2p + \cos^2 2p})} + 3(\cancel{\cos p \cos 2p + \sin p \sin 2p})}{(\cos p + \cos 2p)^2}$$