DIFFERENTIAL CALCULUS - CHAPTER REVIEW

1 Differentiate:

(a) $\sin x + \tan 2x$ **(b)** $3\cos 4x - 5\sin 2x$ **(c)** $x\cos x$

(d) $\dfrac{\cos x}{\sin x}$ **(e)** $2e^{-x}\cos 3x$ **(f)** $\log_e(\sin 2x)$

2 Differentiate with respect to x:

(a) $(x^2 + 2x)e^x$ **(b)** $2e^{-x}\ln x$ **(c)** $\log_e(1 + e^x)$

(d) $\log_e(x^2+2x)$ **(e)** $(x^2+3x)e^{-3x}$ **(f)** $e^{\sqrt{x}}+\log_e\sqrt{x}$

3 The position x of a particle moving along a straight line at any time t is given by $x = 3 + 6\cos\frac{\pi t}{6}$.

(a) Find the position of the particle for values of $t = 0, 2, 4, 6, 8, 10, 12$.

(b) Find the velocity and acceleration of the particle when it first reaches the position $x = 0$.

6 Differentiate:

(a) $\log_e(x\tan x)$ **(b)** $\log_e\left(\frac{x^3-6}{e^{-x}-1}\right)$ **(c)** $\log_e=\left(\frac{\sqrt{x}\cos x}{1-\sin^2 x}\right)$

7 Differentiate:

(a) $x^3\,10^x$ **(b)** $\sin x + \log_a x$ **(c)** $2^x + 3^x + 4^x$ **(d)** $\dfrac{a^x}{\log_a x}$