THE INDEFINITE INTEGRAL

1 Find: **(a)** $\int x\,dx$ **(b)** $\int \left(x^2+x+1\right)dx$ **(c)** $\int \left(3-x^2\right)dx$

(d) $\int \left(6x^5-4x^3+2x\right)dx$ **(e)** $\int dx$ **(f)** $\int x^n\,dx$

2 Find: **(a)** $\int \sqrt{x}\,dx$ **(b)** $\int \frac{1}{x^2}dx$ **(c)** $\int \left(1+\sqrt{x}+x\right)dx$

3 $\int \left(1+2x+3x^2\right)dx$ is equal to:

A $x+x^2+\frac{x^3}{3}+C$ **B** $x+\frac{x^2}{2}+\frac{x^3}{3}+C$ **C** $x+x^2+x^3+C$ **D** $2+6x+C$

4 If $\frac{dy}{dx} = 1 + x + 3x^2$, find the equation of the curve that passes through the point $(2, 6)$.

5 If $\frac{dy}{dx} = 1 + \sqrt{x}$, find the equation of the curve that passes through the point $(4, 10)$.

PRIMITIVES OF TRIGONOMETRIC FUNCTIONS

1 Write the primitive function of:

(a) $\sin 2x$ **(b)** $\cos 3x$ **(c)** $\sec^2 x$ **(d)** $\sin x + \cos x$

(e) $2\sin x - 3\cos x$ **(f)** $\sin\left(x + \frac{\pi}{4}\right)$ **(g)** $\cos\frac{x}{2}$ **(h)** $2\sin 2x$

2 The primitive of $3\cos\frac{x}{3}$ is:

A $-\sin\frac{x}{3}$ **B** $-9\sin\frac{x}{3}$ **C** $\sin\frac{x}{3}$ **D** $9\sin\frac{x}{3}$

PRIMITIVES OF TRIGONOMETRIC FUNCTIONS

3 Find:

(a) $\int\left(\sin\frac{\pi}{4}+\cos\frac{\pi}{4}\right)dx$ **(b)** $\int(\sin x-\cos 2x)\,dx$ **(c)** $\int\sin\left(2x+\frac{\pi}{2}\right)dx$

(d) $\int\cos\left(2x-\frac{\pi}{4}\right)dx$ **(e)** $\int\sec^2 3x\,dx$ **(f)** $\int\left(\frac{1}{2}\sin 2x-\cos x\right)dx$

PRIMITIVES OF TRIGONOMETRIC FUNCTIONS

4 (a) Differentiate $f(x) = log_e(sin\ x)$ (b) Hence integrate $\frac{cos\ x}{sin\ x}$

5 The gradient of a curve is given by $\frac{dy}{dx} = 2\sin 3x$. If the curve passes through the point $\left(\frac{\pi}{3}, 3\right)$, find the equation of the curve.