

$$\textcircled{11} \quad \int (\sin(3x+6) - 4\cos x) dx$$

$$= \int (\sin(3x+6)) dx - 4 \int \cos x dx$$

$$= -\frac{1}{3} \cos(3x+6) - 4\sin x + C$$

$$\textcircled{12} \quad \int \cos^2 x dx$$

$$\begin{aligned} & \cos 2x = \cos^2 x - \sin^2 x \\ & = 2\cos^2 x - 1 \\ \Rightarrow \cos^2 x & = \frac{\cos 2x + 1}{2} \end{aligned}$$

$$= \int \frac{\cos 2x + 1}{2} dx$$

$$= \frac{1}{2} \int \cos 2x dx + \int \frac{1}{2} dx$$

$$= \frac{\sin 2x}{2} + \frac{x}{2} + C$$

$$= \frac{\sin 2x + x}{2} + C$$

$$\textcircled{13} \quad \int \sin x \sin 3x dx$$

$$= \frac{1}{2} (\cos 2x - \cos 4x) dx$$

$$= \frac{\sin 2x}{4} + \frac{\sin 4x}{8} + C$$

$$= \frac{\sin 4x + 2\sin 2x}{8} + C$$

$$\textcircled{14} \quad \int \sin^3 x dx$$

$$\begin{aligned} \sin 3x &= 3\sin x - 4\sin^3 x \\ \hookrightarrow \sin^3 x &= \frac{3\sin x - \sin 3x}{4} \end{aligned}$$

Made with Goodnotes

$$= -\frac{3\cos x}{4} + \frac{\cos 3x}{12} + C$$

$$\begin{aligned}
 (15) \quad & \int (1 + \tan^2 x) dx = \int \left(1 + \frac{\sin^2 x}{\cos^2 x}\right) dx \\
 & = \cancel{\int dx} + \int \cancel{\tan^2 x} dx \\
 & = \int \frac{\sin^2 x + \cos^2 x}{\cos^2 x} dx \\
 & = \int \frac{1}{\cos^2 x} dx \\
 & = \int \sec^2 x dx = \tan x + C
 \end{aligned}$$

TRY

$$\begin{aligned}
 (16) \quad & \int \tan^2 x dx \quad \boxed{+ \int 1 dx} = \tan x + C' \\
 & \quad \boxed{x + C''}
 \end{aligned}$$

$$\Rightarrow \int \tan^2 x dx = \tan x - x + C^w$$

$$\begin{aligned}
 & \int \tan^2(-x+2) dx \quad \boxed{= \int \tan^2(x-2) dx} \\
 & = -\tan(-x+2) - (-x+2) + C \\
 & = -\tan(-x+2) + x-2 + C
 \end{aligned}$$