

152/5.5

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$$\begin{aligned}
 a) \int \cot^2 x \, dx &= \int \frac{\cos^2 x}{\sin^2 x} \, dx = \int \frac{1 - \sin^2 x}{\sin^2 x} \, dx = \\
 &= \int \frac{1}{\sin^2 x} \, dx - \int \frac{\sin^2 x}{\sin^2 x} \, dx = -\cot x - \int 1 \, dx = \\
 &= \underline{\underline{-\cot x - x + C}}
 \end{aligned}$$

$$\begin{aligned}
 b) \int \frac{\sin 2x}{\cos x} \, dx &= \int \frac{2 \sin x \cos x}{\cos x} \, dx = \int 2 \sin x \, dx = \\
 &= \underline{\underline{-2 \cos x + C}}
 \end{aligned}$$

$$c) \int \frac{\sin 2x}{\sin x} \, dx = \int \frac{2 \sin x \cos x}{\sin x} \, dx = \int 2 \cos x \, dx = \underline{\underline{2 \sin x + C}}$$

$$\begin{aligned}
 d) \int \frac{\cos 2x}{\cos^2 x} \, dx &= \int \frac{\cos^2 x - \sin^2 x}{\cos^2 x} \, dx = \int \frac{\cos^2 x}{\cos^2 x} \, dx - \int \frac{\sin^2 x}{\cos^2 x} \, dx = \\
 &= \int 1 \, dx - \int \frac{1 - \cos^2 x}{\cos^2 x} \, dx = x - \int \frac{1}{\cos^2 x} \, dx + \int \frac{\cos^2 x}{\cos^2 x} \, dx = \\
 &= x - \log x + x + C = \underline{\underline{2x - \log x + C}}
 \end{aligned}$$

$$\begin{aligned}
 e) \int \frac{\cos 2x}{\sin^2 x} \, dx &= \int \frac{\cos^2 x - \sin^2 x}{\sin^2 x} \, dx = \int \frac{1 - \sin^2 x - \sin^2 x}{\sin^2 x} \, dx = \\
 &= \int \frac{1}{\sin^2 x} \, dx - 2 \int \frac{\sin^2 x}{\sin^2 x} \, dx = \underline{\underline{-\cot x - 2x + C}}
 \end{aligned}$$

$$\begin{aligned}
 f) \int \frac{1}{\sin^2 x \cos^2 x} \, dx &= \int \frac{\sin^2 x + \cos^2 x}{\sin^2 x \cos^2 x} \, dx = \\
 &= \int \frac{\sin^2 x}{\sin^2 x \cos^2 x} \, dx + \int \frac{\cos^2 x}{\sin^2 x \cos^2 x} \, dx = \int \frac{1}{\cos^2 x} \, dx + \int \frac{1}{\sin^2 x} \, dx = \underline{\underline{\log x - \cot x + C}}
 \end{aligned}$$

152/5.5 g) $\int \sin^2 \frac{1}{2}x \, dx =$

Veroc: $\sin^2 \frac{1}{2}x = \frac{1}{2}(1 - \cos x)$

$$= \int \frac{1}{2}(1 - \cos x) \, dx = \frac{1}{2} \left(\int 1 \, dx - \int \cos x \, dx \right) =$$

$$= \underline{\underline{\frac{1}{2}x - \frac{1}{2}\sin x + C}} \quad \text{hebo} \quad \underline{\underline{\frac{1}{2}(x - \sin x) + C}}$$

h) $\int \cos^2 \frac{1}{2}x \, dx =$

Veroc: $\cos^2 \frac{1}{2}x = \frac{1}{2}(1 + \cos x)$

$$= \int \frac{1}{2}(1 + \cos x) \, dx = \frac{1}{2} \left(\int 1 \, dx + \int \cos x \, dx \right) =$$

$$= \underline{\underline{\frac{1}{2}(x + \sin x) + C}}$$

i) $\int (3 \sin^2 x + 3 \cos^2 x) \, dx = 3 \int (\sin^2 x + \cos^2 x) \, dx =$

$$= 3 \int 1 \, dx = \underline{\underline{3x + C}}$$