25.(a) Substitute $u = \sin x$, $du = \cos x\,dx$: $\int \cos x \cdot \sin x\,dx = \int u\,du = \frac{1}{2}u^2 + C = \frac{1}{2}\sin^2 x + C$

(b) Substitute $u = \cos x$, $du = -\sin x\,dx$: $\int \cos x \cdot \sin x\,dx = -\int u\,du = \frac{-1}{2}u^2 + D = \frac{-1}{2}\cos^2 x + D$

(c) The two anti derivatives are vertical shifts of each other since $\frac{1}{2}\sin^2 x - \left(-\frac{1}{2}\cos^2 x\right) = \frac{1}{2}\cdot 1$

25.3 Substitution to alter the Form of an Integral

2. Use $u = x - 7$, $du = dx$, $x = u + 7$:

$\int \frac{u+10}{u}\,du = \int (1 + \frac{10}{u})du = u + 10\ln|u| + C = x - 7 + 10\ln(x-7) + C$ or: $x + 10\ln|x-7| + D$

4. Use $u = 3 + x$, $du = dx$, $x = u - 3$:

$\int \frac{2(u-3)}{u}\,du = \int (2 - \frac{6}{u})du = 2u - 6\ln|u| + C = 2(3+x) - 6\ln|3+x| + C$ or: $2x - 6\ln|3+x| + D$

6. Use $u = 2t + 5$, $du = 2\,dt$, $t = \frac{u-5}{2}$:

$\int \frac{u-5}{2}\sqrt{u}\,\frac{1}{2}du = \int (\frac{1}{4}u^{\frac{3}{2}} - \frac{5}{4}u^{\frac{1}{2}})du = \frac{1}{4}\cdot\frac{2}{5}u^{\frac{5}{2}} - \frac{5}{4}\cdot\frac{2}{3}u^{\frac{3}{2}} + C = \frac{1}{10}(2t+5)^{\frac{5}{2}} - \frac{5}{6}(2t+5)^{\frac{3}{2}} + C$

8. Use $u = \sin(3x)$, $\frac{du}{dx} = 3\cos(3x)$, $\frac{1}{3}du = \cos(3x)\,dx$:

$\int \frac{\cos(3x)}{\sin(3x)}dx = \int \frac{1}{u}\cdot\frac{1}{3}du = \frac{1}{3}\ln|u| + C = \frac{1}{3}\ln|\sin(3x)| + C$

10. Use $u = \sin t$, $du = \cos t$: $\int u^4\,du = \frac{1}{5}u^5 + C = \frac{1}{5}(\sin t)^5 + C$