$(\sqrt{x}+1)$ $\int \sqrt{x}+1$ $\sqrt{x}$ $\cancel{f(x) = \frac{1}{\sqrt{x}+1}}$

$f(x) = \sqrt{x}+1, \; f'(x) = \frac{1}{2}(x)^{-\frac{1}{2}} + 0$ $\cancel{f'(x) = \frac{1}{(x)(\sqrt{x}+1)}}$

$f'(x) = \frac{1}{2\sqrt{x}}$ $\bigg| \int (f(x))^{-1} \cdot 2 f'(x)\,dx$ $\cancel{f'(x) = \frac{1}{\frac{1}{2}(x)^{-\frac{1}{2}}}}$

$$\int \frac{1}{\sqrt{x}+1} \cdot \frac{1}{2\sqrt{x}}\,dx = 2\ln(f(x)) + c$$

$$= 2\ln(\sqrt{x}+1) + c$$

Q7: $\int \frac{dx}{\sqrt{x+1}-\sqrt{x}}$ Rationalizing

$$\frac{dx}{\sqrt{x+1}-\sqrt{x}} = \int \frac{\sqrt{x+1}+\sqrt{x}}{(\sqrt{x+1}-\sqrt{x})(\sqrt{x+1}+\sqrt{x})}\,dx$$

$$= \int \frac{\sqrt{x+1}+\sqrt{x}}{(\sqrt{x+1})^2 - (\sqrt{x})^2}\,dx = \int \frac{\sqrt{x+1}+\sqrt{x}}{x+1-x}\,dx = \int \frac{(x+1)^{\frac{1}{2}} + x^{\frac{1}{2}}}{1}\,dx$$

$$= \int (x+1)^{\frac{1}{2}}\,dx + \int x^{\frac{1}{2}}\,dx = \frac{(x+1)^{\frac{3}{2}}}{\frac{3}{2}} + \frac{x^{\frac{3}{2}}}{\frac{3}{2}} + c$$

$$= \frac{2}{3}(x+1)^{\frac{3}{2}} + \frac{2}{3}(x)^{\frac{3}{2}} + c$$

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$\frac{1}{2}+1$
$\frac{1+2}{2}$

Q Evaluate following indefinite integrals.

(i) $\int (3x^2 - 2x+1)\,dx$ (ii) $\int \left(\sqrt{x} + \frac{1}{\sqrt{x}}\right)dx$ $\left(\frac{2}{3}x^{\frac{3}{2}} + 2x^{\frac{1}{2}} + c\right)$

(iii) $\int (2x+3)^{\frac{1}{2}}\,dx$

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