a) $\displaystyle\int_1^4 (x^2-2x+3)\,dx = \frac{1}{3}x^3 - x^2 + 3x \Big|_1^4$

$= \frac{1}{3}4^3 - 4^2 + 3\cdot 4 - \left(\frac{1}{3} - 1 + 3\right)$

b) $\displaystyle\int_{-1}^{1} (2x^3+3x^2+2x-1)\,dx =$

$\frac{1}{2}x^4 + x^3 + x^2 - x \Big|_{-1}^{1} =$

$\left(\frac{1}{2} + 1 + 1 - 1\right) - \left(\frac{1}{2}(-1) + (-1)^3 + (-1)^2 - (-1)\right)$

c) $\displaystyle\int_{-1}^{1} (x+1)^{\frac{1}{3}}\,dx = \frac{1}{\frac{1}{3}+1}\cdot (x+1)^{\frac{1}{3}+1}\Big|_{-1}^{1}$

$= \frac{3}{4}(x+1)^{\frac{4}{3}}\Big|_{-1}^{1} = \frac{3}{4}(1+1)^{\frac{4}{3}} - \frac{3}{4}(-1+1)^{\frac{4}{3}}$

d) $-\cos x \Big|_{\frac{\pi}{4}}^{\frac{3\pi}{4}} = -\left(\cos\frac{3\pi}{4} - \cos\frac{\pi}{4}\right)$

$= -\left(-\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2}\right) = \sqrt{2}$

e) $\int (1+\tan^2 x)\, dx \overset{\text{tables}}{=} \tan x$

$\Rightarrow \int_0^{\frac{\pi}{4}} (1+\tan^2 x)\, dx = \tan x \Big|_0^{\frac{\pi}{4}} = \tan\frac{\pi}{4} - \tan 0 = 1$

f) $\int_0^2 (1+2x)^3 dx = \frac{1}{2} \cdot \int_0^2 (\underbrace{1+2x}_{})^3 \cdot \underbrace{2}_{(\,)'} \cdot dx$

$= \frac{1}{2} \cdot \frac{1}{4} (1+2x)^4 \Big|_0^2 = \frac{1}{8}(1+2\cdot 2)^4 - \frac{1}{8}(1+2\cdot 0)^4$

g) $$\int_1^4 x^{-\frac{1}{2}}\,dx = \frac{1}{-\frac{1}{2}+1}\, x^{-\frac{1}{2}+1}\Big|_1^4$$

$$= 2\sqrt{x}\Big|_1^4 = 2\sqrt{4} - 2\sqrt{1} = 2$$

h) $$\int_0^{\frac{\pi}{2}} (\underbrace{\sin x}_{()'})^2 \cos x\,dx = \frac{1}{3}(\sin x)^3\Big|_0^{\frac{\pi}{2}}$$

$$= \frac{1}{3}\left(\sin\frac{\pi}{2}\right)^3 - \frac{1}{3}(\sin 0)^3 = \frac{1}{3}$$