f) $$\int (3x^2+x)^3 (6x+1)\, dx = \frac{1}{4}(3x^2+x)^4 + C$$

$$(3x^2+x)' = 3\cdot 2x + 1 = 6x+1$$

g) $$\int (4x^2+3)^4 \cdot x \cdot dx = \frac{1}{8}\int (4x^2+3)^4 \cdot 8x \cdot dx$$

$$(4x^2+3)' = 4\cdot 2x = 8x$$

$$= \frac{1}{8}\cdot \frac{1}{5}(4x^2+3)^5 + C = \frac{1}{40}\cdot (4x^2+3)^5 + C$$

h) $$\int (\sin x)^2 \cdot \cos x\, dx = \frac{1}{3}(\sin x)^3 + C$$

$$(\sin x)' = \cos x$$

i) $$\int (\tan x)^2 \cdot \left(\frac{1}{\cos^2 x}\right) dx = \frac{1}{3}(\tan x)^3 + C$$

$$(\tan x)' = \frac{1}{\cos^2 x}$$

j) $\int (x+3)^{\frac{1}{2}} dx = \dfrac{1}{\frac{1}{2}+1} \cdot (x+3)^{\frac{1}{2}+1} + C$

$= \dfrac{2}{3}(x+3)^{\frac{3}{2}} + C = \dfrac{2}{3}\sqrt{(x+3)^3} + C,$

ya que $(x+3)' = 1.$

k) $\int (3x+1)^{-\frac{1}{2}} dx = \dfrac{1}{3}\int (3x+1)^{-\frac{1}{2}} \cdot 3\, dx$

$(3x+1)' = 3$

$= \dfrac{1}{3} \cdot \dfrac{1}{-\frac{1}{2}+1} \cdot (3x+1)^{-\frac{1}{2}+1} + C$

$= \dfrac{1}{3} \cdot 2 \cdot (3x+1)^{\frac{1}{2}} + C = \dfrac{2}{3}\sqrt{3x+1} + C$

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

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

$(x^2+2x)' = 2x+2$

$$= \frac{1}{2} \cdot \frac{1}{-\frac{1}{2}+1} \cdot (x^2+2x)^{-\frac{1}{2}+1} + C$$

$$= (x^2+2x)^{\frac{1}{2}} + C = \sqrt{x^2+2x} + C$$