Correction primitives

a) $f(x)=\dfrac{x+1}{(x^2+2x)^3}=\dfrac{1}{2}.\dfrac{2x+2}{(x^2+2x)^3}=\dfrac{1}{2}\dfrac{u'(x)}{u^3(x)}=\dfrac{1}{2}u'(x)u^{-3}(x)=\dfrac{1}{2}\times\dfrac{1}{-2}\times(-2)u'(x)u^{-3}(x),$

$u(x) = x^2 + 2x$, $n - 1 = -3$, $n = -2$, $F(x)=-\dfrac{1}{4}(x^2+2x)^{-2}=-\dfrac{1}{4(x^2+2x)^2}$.

b) $f(x)=\dfrac{x}{x^2-1}=\dfrac{1}{2}\times\dfrac{2x}{x^2-1}=\dfrac{1}{2}\times\dfrac{u'(x)}{u(x)}$ avec $u(x) = x^2 - 1$, $F(x)=\dfrac{1}{2}\ln u(x)=\dfrac{1}{2}\ln(x^2-1)+k$.

c) $f(x)=x-1+\dfrac{\ln x}{x}=x-1+\dfrac{1}{x}\times\ln x=x-1+\dfrac{1}{2}\times 2u'(x)\times u(x)$ avec $u(x) = \ln x$,

$F(x)=\dfrac{x^2}{2}-x+\dfrac{1}{2}u^2(x)=\dfrac{x^2}{2}-x+\dfrac{1}{2}(\ln x)^2+k$.

d) $f(x) = (\sin^2 x - 3\sin x + 8).\cos x = \cos x \times \sin^2 x - 3\cos x \times \sin x + 8\cos x$;

$u(x) = \sin^3 x$, $u'(x) = 3\cos x \sin^2 x$, $v(x) = \sin^2 x$, $v'(x) = 2\cos x \sin x$, $w(x) = \sin x$, $w'(x) = \cos x$.

$F(x)=\dfrac{1}{3}\sin^3 x-\dfrac{3}{2}\times\sin^2 x+8\times\sin x+k$.

$F(\dfrac{3\pi}{2})=0\Leftrightarrow\dfrac{1}{3}\sin^3\dfrac{3\pi}{2}-\dfrac{3}{2}\times\sin^2\dfrac{3\pi}{2}+8\times\sin\dfrac{3\pi}{2}+k=0\Leftrightarrow-\dfrac{1}{3}-\dfrac{3}{2}-8+k=0\Leftrightarrow k=\dfrac{2+9+48}{6}=\dfrac{59}{6}.$

$F(x)=\dfrac{1}{3}\sin^3 x-\dfrac{3}{2}\sin^2 x+8\sin x+\dfrac{59}{6}$.

e) $f(x)=\dfrac{x^3+5x^2+7x+4}{x^2+2x+1}=\dfrac{(x+3)(x^2+2x+1)+1}{x^2+2x+1}=x+3+\dfrac{1}{x^2+2x+1}=x+3+\dfrac{1}{(x+1)^2}$.

$F(x)=\dfrac{x^2}{2}+3x-\dfrac{1}{x+1}$.