$$\int x^n \, dx \overset{\circledast}{=} \frac{1}{n+1} x^{n+1} + C \quad , \; n \neq -1$$

1) $\int x^5 \, dx \overset{\circledast}{=} \frac{1}{6} x^6 + C$

2) $\int 5x^3 \, dx \overset{\circledast}{=} 5 \cdot \frac{1}{4} x^4 + C = \frac{5}{4} x^4 + C$

3) $\int \frac{1}{2} x^4 \, dx \overset{\circledast}{=} \frac{1}{2} \cdot \frac{1}{5} x^5 + C = \frac{1}{10} x^5 + C$

4) $\int 3 \, du = 3u + C$

5) $\int (3t^2 + 5t - 1) \, dt \overset{\circledast}{=} t^3 + \frac{5}{2} t^2 - t + C$

6) $\int \frac{1}{t^2} \, dt = \int t^{-2} dt \overset{\circledast}{=} \frac{1}{-2+1} t^{-2+1} + C = \frac{1}{-1} t^{-1} + C = -\frac{1}{t} + C$

7) $\int \sqrt{v} \, dv = \int v^{1/2} dv \overset{\circledast}{=} \frac{1}{\frac{1}{2}+1} v^{\frac{1}{2}+1} + C = \frac{1}{\frac{3}{2}} v^{\frac{3}{2}} + C = \frac{2}{3} \sqrt{v^3} + C$

8) $\int \sqrt[3]{x} \, dx = \int x^{1/3} dx \overset{\circledast}{=} \frac{1}{\frac{1}{3}+1} x^{\frac{1}{3}+1} + C = \frac{1}{\frac{4}{3}} x^{\frac{4}{3}} + C = \frac{3}{4} \sqrt[3]{x^4} + C$

9) $\int \frac{5}{\sqrt[4]{x^3}} \, dx = \int 5x^{-3/4} dx \overset{\circledast}{=} 5 \frac{1}{\underbrace{-\frac{3}{4}+1}_{1/4}} x^{-\frac{3}{4}+1} + C = 5 \cdot 4 x^{1/4} + C = 20 \sqrt[4]{x} + C$

$$\int u^n \cdot u' \, dx \overset{\circledast}{=} \frac{1}{n+1} u^{n+1} + C \quad , \text{ si } n \neq -1$$

10) $\int \frac{3}{\sqrt{4x+1}} \, dx = \int 3 (4x+1)^{-1/2} dx$

$u = 4x+1$
$u' = 4$

$= \int \frac{3}{4} \cdot 4 (4x+1)^{-1/2} dx = \frac{3}{4} \int 4 (4x+1)^{-1/2} dx \overset{\circledast}{=} \frac{3}{4} \cdot \frac{1}{-\frac{1}{2}+1} (4x+1)^{-\frac{1}{2}+1} + C$

$= \frac{3}{\cancel{4}_{2}} \cdot \cancel{2} (4x+1)^{1/2} + C = \frac{3}{2} \sqrt{4x+1} + C$

11) $\int (\underbrace{3u^2 + 5u - 1}_{u})^3 (\underbrace{6u + 5}_{u'}) \, du$

$\overset{\circledast}{=} \frac{1}{4} (3u^2 + 5u - 1)^4 + C$

12) $\displaystyle\int \frac{2x}{(1+x^2)^3}\,dx = \int \underbrace{2x}_{u'}\cdot(\underbrace{1+x^2}_{u})^{-3}\,dx \overset{*}{=} \frac{1}{-2}(1+x^2)^{-2}+c = -\frac{1}{2(1+x^2)^2}+c$

13) $\displaystyle\int \underbrace{(x^3+3x^2+2x+1)}_{u}\underbrace{(3x^2+6x+2)}_{u'}\,dx \overset{*}{=} \frac{1}{1+1}(x^3+3x^2+2x+1)^{1+1}+c$

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

14) $\displaystyle\int \frac{\ln^2(x)}{x}\,dx = \int \frac{1}{x}\cdot\ln^2(x)\,dx \overset{*}{=} \frac{1}{3}\ln^3(x)+c$ | Rappel : $(\ln(x))^2 = \ln^2(x)$

$u = \ln(x)$
$u' = \frac{1}{x}$

15) $\displaystyle\int e^x\,dx \overset{*}{=} e^x+c$

$\boxed{\displaystyle\int e^u\cdot u'\,dx \overset{*}{=} e^u+c}$

16) $\displaystyle\int 2e^{3t}\,dt = \frac{2}{3}\int 3e^{3t}\,dt \overset{*}{=} \frac{2}{3}e^{3t}+c$

$u = 3t$
$u' = 3$

17) $\displaystyle\int 2xe^{-x^2}\,dx = -\int -2xe^{-x^2}\,dx \overset{*}{=} -e^{-x^2}+c$

$u = -x^2$
$u' = -2x$

18) $\displaystyle\int \frac{1}{x}\,dx = \ln(|x|)+c$

$\boxed{\displaystyle\int \frac{u'}{u}\,du \overset{*}{=} \ln(|u|)+c}$

19) $\displaystyle\int \frac{2}{4x-3}\,dx = \frac{1}{2}\int\frac{2\cdot 2}{4x-3}\,dx \overset{*}{=} \frac{1}{2}\ln(|4x-3|)+c$

$u = 4x-3$
$u' = 4$

20) $\displaystyle\int \frac{2x+3}{x^2+3x+3}\,dx \overset{*}{=} \ln(|x^2+3x+3|)+c$

$u = x^2+3x+3$
$u' = 2x+3$