GENERAL POWER RULE

$$\int u^n \frac{du}{dx}\,dx$$

$$= \int u^n\,du$$

$$= \frac{u^{n+1}}{n+1} + C$$

GUIDELINES FOR u

1. $(\ u\ )^{\text{POWER}}$
2. $\sqrt{\ u\ }$

1. $\int (x-7)^{\frac{3}{2}}\,dx$

$u = x-7 \quad \frac{du}{dx} = 1$

$dx\left(\frac{du}{dx}\right) = 1\,dx$

$du = dx$

$\int u^{\frac{3}{2}}\,du$

$= \frac{u^{\frac{3}{2}+1}}{\frac{3}{2}+1} + C$

$= \frac{u^{\frac{5}{2}}}{\frac{5}{2}} + C$

$= \frac{2}{5}u^{5/2} + C$

$= \boxed{\frac{2}{5}(x-7)^{5/2} + C}$

2. $\int (x^2-3)^5 (2x)\,dx$

$u = x^2-3 \quad du = (2x)\,dx$

$\int u^5\,du$

$= \frac{u^6}{6} + C$

$= \boxed{\frac{1}{6}(x^2-3)^6 + C}$

3. $\int (x^4-7x+2)^8 (4x^3-7)\,dx$

$u = x^4-7x+2 \quad du = (4x^3-7)\,dx$

$\int u^8\,du$

$= \frac{u^9}{9} + C$

$= \boxed{\frac{1}{9}(x^4-7x+2)^9 + C}$