What name did you receive at birth? Key

AP Calculus AB: 6.1 Indefinite Integration (Boost & Divide)

1. $\int 7\,dx$

$7x+C$

2. $\int 8x^3+3x^2-9\,dx$

$\frac{8x^4}{4}+\frac{3x^3}{3}-9x+C$

$2x^4+x^3-9x+C$

3. $\int \frac{2}{3}x^4-\frac{5}{2}x^6-8\,dx$

$\frac{2x^5}{15}-\frac{5x^7}{14}-8x+C$

4. $\int \frac{4}{7x^2}\,dx = \int \frac{4x^{-2}}{7}\,dx$

$\frac{4x^{-1}}{-7}+C = \frac{4}{-7x}+C$

5. $\int 3\sqrt{x}+5\sqrt[4]{x^3}-2\,dx$

$3x^{1/2}+5x^{3/4}-2$

$\frac{3x^{3/2}}{3/2}+\frac{5x^{7/4}}{7/4}-2x+C$

$2x^{3/2}+\frac{20}{7}x^{7/4}-2x+C$

6. $\int \frac{2}{8}\sqrt[3]{x^5}\,dx$ $\quad x^{5/3}$

$\frac{2x^{8/3}}{8}=\frac{6x^{8/3}}{64}+C=\frac{3x^{8/3}}{32}+C$

$\frac{8}{3}$

7. $\int \frac{3}{5}x^2+\frac{6}{5x^4}\,dx$ $\quad \frac{6x^{-4}}{5}$

$\frac{3x^3}{15}+\frac{6x^{-3}}{-15}+C$

$\frac{x^3}{5}-\frac{2}{3x^3}+C$

8. $\int \frac{3}{2x^4}-\frac{5}{3x^2}+4\,dx$

$\frac{3x^{-3}}{-6}-\frac{5x^{-1}}{-3}+4x+C$

$-\frac{1}{2x^3}+\frac{5}{3x}+4x+C$

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

$(3x-5)(3x-5)$

$9x^2-15x-15x+25$

$\int 9x^2-30x+25\,dx$

$\frac{9x^3}{3}-\frac{30x^2}{2}+25x+C$

$3x^3-15x^2+25x+C$

10. $\int \frac{4x^4-2x^3-5x^2+6}{x^2}\,dx$

$\int 4x^2-2x-5+\frac{6}{x^2}\,dx$

$\frac{4x^3}{3}-\frac{2x^2}{2}-5x+\frac{6x^{-1}}{-1}+C$

$\frac{4x^3}{3}-x^2-5x-\frac{6}{x}+C$

11. $\int \frac{(2x-7)^2}{x^4}\,dx$ $\quad 4x^2-28x+49$

$\frac{4x^2}{x^4}-\frac{28x}{x^4}+\frac{49}{x^4}$

$\int \frac{4}{x^2}-\frac{28}{x^3}+\frac{49}{x^4}\,dx$

$\frac{4x^{-1}}{-1}-\frac{28x^{-2}}{-2}+\frac{49x^{-3}}{-3}+C$

$-\frac{4}{x}+\frac{14}{x^2}-\frac{49}{3x^3}+C$

12. $\int \frac{(x+3)^2}{\sqrt{x}}\,dx = \frac{x^2+6x+9}{x^{1/2}}$

$=\int x^{3/2}+6x^{1/2}+\frac{9}{x^{1/2}}\,dx$

$\frac{x^{5/2}}{5/2}+\frac{6x^{3/2}}{3/2}+\frac{9x^{1/2}}{1/2}+C$

$\frac{2x^{5/2}}{5}+4x^{3/2}+18\sqrt{x}+C$

Flashback

Find the value of a and b that the function of f(x) both continuous and differentiable at the point where the rule for the function changes.

$$f(x)=\begin{cases} x^2, & x<3 \\ ax+b, & x\geq 3 \end{cases}$$

cont

$x^2=ax+b$

$(3)^2=a(3)+b$

$9=3a+b$

$b=9-3a$

diff

$2x=a$

$a=2(3)=6$

$a=6$

$b=9-3(6)$

$b=9-18=-9$

$b=-9$