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Calculus – Antiderivatives – Indefinite Integrals

Name: ______________________
Date: ________ **Period:** ______ **Score:** ______

Evaluate the indefinite integral. Check your result by differentiation.

1) $\int 3x^4 dx$

$= \frac{3}{5} x^5 + C$

2) $\int \frac{1}{x^3} dx = \int x^{-3} dx$

$= \frac{x^{-2}}{-2} = \boxed{-\frac{1}{2x^2} + C}$

3) $\int 5u^{3/2} du = 5 \int u^{3/2} du$

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

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

$= \frac{2}{3} \cdot 2x^{1/2} + C = \boxed{\frac{4}{3}\sqrt{x} + C}$

5) $\int 6t^2 \sqrt[3]{t} dt = 6 \int t^2 \cdot t^{1/3} dt = 6 \int t^{7/3} dt$

$= 6 \cdot \frac{3}{10} t^{10/3} + C = \boxed{\frac{9}{5} t^{10/3} + C}$

6) $\int y^3(2y^2-3)dy = \int 2y^5 - 3y^3\,dy$

$= \boxed{\frac{1}{3}y^6 - \frac{3}{4}y^4 + C}$

7) $\int (8x^4+4x^3-6x^2-4x+5)dx$

$= \frac{8}{5}x^5 + x^4 - 2x^3 - 2x^2 + 5x + C$

8) $\int \sqrt{x}(x+1)dx = \int x^{3/2} + x^{1/2}\,dx$

$= \boxed{\frac{2}{5}x^{5/2} + \frac{2}{3}x^{3/2} + C}$

9) $\int \left(\frac{2}{x^3}+\frac{3}{x^2}+5\right)dx = \int 2x^{-3} + 3x^{-2} + 5\,dx$

$= -x^{-2} - 3x^{-1} + 5x + C$

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

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

$= \boxed{\frac{2}{5}x^{5/2} + \frac{8}{3}x^{3/2} - 8x^{1/2} + C}$

11) $\int \left(\sqrt[3]{x}+\frac{1}{3\sqrt{x}}\right)dx = \int x^{1/3} + \frac{1}{3}x^{-1/2}\,dx$

$= \boxed{\frac{3}{4}x^{4/3} + \frac{2}{3}x^{1/2} + C}$

12) $\int (3\sin t - 2\cos t)dt$

$= -3\cos t - 2\sin t + C$

13) $\int (4\csc x\cot x + 2\sec^2 x)dx$

$= -4\csc x + 2\tan x + C$

