

Circuit Training - Mixed Integration Practice

Name _____

Directions: Beginning in cell #1, integrate. Search for your answer and that becomes cell #2. Continue in this manner until you complete the circuit. Note: The last 4 problems are challenge problems and may involve geometry, integration by parts, and/or partial fractions.

<p>Answer: $\frac{1}{2} \ln \left \frac{x-1}{x+1} \right + C$</p> <p># <u> 1 </u> $\int (3x^2 + \cos x) dx$</p>	<p>Answer: $-\ln \cos x + C$</p> <p># _____ $\int_0^3 \sin\left(\frac{\pi}{6}x\right) dx$</p>
<p>Answer: $\frac{1}{2} \sin^{-1}(2x) + C$</p> <p># _____ $\int_0^3 \sqrt{9 - x^2} dx$</p>	<p>Answer: $\frac{-\pi x^4}{2} + \frac{8\pi x^3}{3} - 3\pi x^2 + C$</p> <p># _____ $\int x^2 \cos(x^3) dx$</p>
<p>Answer: $e^{x^3} + C$</p> <p># _____ $\int x(x^2 - 3) dx$</p>	<p>Answer: $\frac{1}{2} x^2 + \ln x + C$</p> <p># _____ $\int \sec(2x) \tan(2x) dx$</p>

Answer: $\frac{9\pi}{4}$

_____ $\int \ln x \, dx$

Answer: $x^3 + \sin x + C$

_____ $\int 3x^2 e^{x^3} \, dx$

Answer: $\frac{1}{2} \ln(x^2 + 1) + C$

_____ $\int \frac{x^2+1}{x} \, dx$

Answer: $\frac{3}{2}$

_____ $\int \frac{1}{1+x^2} \, dx$

Answer: $\frac{1}{3} \sin(x^3) + C$

_____ $\int 2 \sin x \cos x \, dx$

Answer: $-\frac{1}{2} \cos(2x) + C$

_____ $\int x\sqrt{x^2 + 3} \, dx$

Answer: $9\pi x - \frac{1}{5}\pi x^5 + C$

_____ $2\pi \int x(-x^2 + 4x - 3)dx$

Answer: $\frac{6}{\pi}$

_____ $\int \frac{1}{x \ln x} dx$

Answer: $x \sin x + \cos x + C$

_____ $\int \frac{1}{x^2-1} dx$

Answer: $\frac{1}{4}x^4 - \frac{3}{2}x^2 + c$

_____ $\int \frac{x^2-3}{x} dx$

Answer: $\frac{1}{2} \sec(2x) + C$

_____ $\int_1^2 e^{\ln x} dx$

Answer: $\frac{14\pi}{15}$

_____ $\int \frac{dx}{\sqrt{1-4x^2}}$

Answer: $\frac{x^2}{2} - 3 \ln|x| + C$

_____ $\int x\sqrt{x} dx$

Answer: $x \ln x - x + C$

_____ $\int x \cos x dx$

Answer: $\ln|\ln x| + C$

_____ $\pi \int_{-1}^1 (1^2 - (1 - x^2)^2) dx$

Answer: $\tan^{-1}x + C$

_____ $\int \tan x dx$

Answer: $\frac{1}{3}(x^2 + 3)^{\frac{3}{2}} + C$

_____ $\int \frac{x}{x^2+1} dx$

Answer: $\frac{2}{5}x^{\frac{5}{2}} + C$

_____ $\int (\pi(3)^2 - \pi(x^2)^2) dx$