

Name _____ Hour _____

Topic 6.8 - Finding Antiderivatives and Indefinite Integrals: Basic Rules and Notation (Circuit)
 Begin in the first cell marked #1 and find the antiderivative of each given function. To advance in the circuit, search for your answer and mark that cell #2. Continue in this manner until you complete the circuit. Show all pertinent work.

# 1	Ans: $-\sin x + \frac{3x^2}{2} + 3x + 1$	# _____	Ans: $-\frac{7}{x} + C$
$\int -9 dx$		$\int \frac{7}{x} dx$	
# _____	Ans: $\frac{3x^{4/3}}{2} + C$	# _____	Ans: $x + C$
$\int \left(x^{3/4} - \frac{1}{x^{3/4}} \right) dx$		$\int \frac{\sin x}{1 - \sin^2 x} dx$	
# _____	Ans: $3e^x + \ln x + \frac{1}{x} + C$	# _____	Ans: $\frac{9^x}{\ln(9)} + C$
Given $f'''(x) = \cos x$, $f(0) = 1$, $f'(0) = 2$, and $f''(0) = 3$, find $f(x)$.		$\int \left(2 - \frac{1}{x^5} + \frac{7}{x^3} \right) dx$	

# _____	Ans: $x^2 + 2x - 10$	# _____	Ans: $-\frac{1}{x} + \cos x + C$
Given $f'''(x) = 2x$, $f'(2) = -1$, and $f(3) = 1$, find $f(x)$.		$\int (\sec^2 x + \cos x + 1) dx$	
# _____	Ans: $x^2 + 6x + C$	# _____	Ans: $-9x + C$
$\int \frac{7}{x^2} dx$		$\int -5x dx$	
# _____	Ans: $\frac{x^3 - 5x^2 + 25x + C}{3}$	# _____	Ans: $-\cos x + 2x - (2 + 2\pi)$
$\int \frac{x^3 - 4x - 1}{2x^3} dx$		$\int \left(3e^x + \frac{1}{x} - \frac{1}{x^2} \right) dx$	
# _____	Ans: $\frac{4x^{7/4} - 4x^{1/4} + C}{7}$	# _____	Ans: $2x + \frac{1}{4x^4} - \frac{7}{2x^2} + C$
$\int 3\sqrt{x^2} dx$		$\int 5\sqrt{x} dx$	

# _____	Ans: $\frac{x^3}{3} - 5x + 7$	# _____	Ans: $\frac{1}{2} \left(\frac{4}{x} + \frac{1}{2x^2} \right) + C$
Given $f''(x) = \frac{1}{x^{3/2}}$, $f'(4) = 2$, and $f(0) = 1$, find $f(x)$.		$\int x^2(3+x)^2 dx$	
# _____	Ans: $\ln(x)^7 + C$	# _____	Ans: $\sec x + C$
$\int \left(\frac{2}{3}x^5 - \frac{5}{2}x + \frac{1}{2} \right) dx$		Given $f''(x) = 2$, $f'(1) = 4$, and $f(2) = -2$, find $f(x)$.	
# _____	Ans: $\frac{18x^{5/2}}{5} - 8x^{3/2} + 8\sqrt{x} + C$	# _____	Ans: $\frac{9x^{5/3}}{5} + C$
$\int \left(\frac{1}{x^2} - \sin x \right) dx$		$\int (x-5)^2 dx$	

# _____	Ans: $\frac{10x^{3/2}}{3} + C$	# _____	Ans: $-4\sqrt{x} + 3x + 1$
$\int 2\sqrt{x} dx$		Given $f''(x) = \cos x$, $f'(\pi) = 2$, and $f(\pi) = -1$, find $f(x)$.	
# _____	Ans: $\frac{x^6}{9} - \frac{5x^2}{4} + \frac{x}{2} + C$	# _____	Ans: $-\frac{5x^2}{2} + C$
$\int 9^x dx$		$\int (6+2x) dx$	
# _____	Ans: $\tan x + \sin x + x + C$	# _____	Ans: $3x^3 + \frac{3x^4}{2} + \frac{x^5}{5} + C$
$\int (\sin^2 x + \cos^2 x) dx$		$\int \frac{(3x-2)^2}{\sqrt{x}} dx$	