AB Calculus Ch 6 Anti-Derivatives — Name ANSWER KEY

Monday 12 February 2018 **HOMEWORK** — Period 2 3 4 5

Find the Derivatives in part (a) & column 1. From your understanding of the patterns for derivatives, find the anti-derivatives in part (b) & (c), columns 2 & 3. **Show work in your HW notebook. There is not enough room here!**

Find Derivative	Find Anti-Derivative	Find Anti-Derivative
1a. $F(x)=x^3-x^2+x+7$ $\frac{dF}{dx}=f(x)=3x^2-2x+1$	1b. $f(x)=x^2+x-4$ $F(x)=\int\left(x^2+x-4\right)dx$ $F(x)=\frac{1}{3}x^3+\frac{1}{2}x^2-4x+c$	1c. $f(x)=4x^3-2x^2+5x+1$ $F(x)=\int\left(4x^3-2x^2+5x+1\right)dx$ $F(x)=x^4-\frac{2}{3}x^3+\frac{5}{2}x^2+x+c$
2a. $F(x)=\sin(x)+\cos(x)$ $\frac{dF}{dx}=f(x)=\cos x-\sin x$	2b. $f(x)=3\sin x-2\cos x$ $F(x)=\int(3\sin x-2\cos x)dx$ $F(x)=-3\cos x-2\sin x+c$	2c. $f(x)=-4\sin x+7\cos x$ $F(x)=\int(-4\sin x+7\cos x)dx$ $F(x)=4\cos x+7\sin x+c$
3a. $F(x)=e^x+8^x$ $\frac{dF}{dx}=f(x)=e^x+\ln(8)\bullet 8^x$	3b. $f(x)=9e^x-\ln 4\bullet 4^x$ $F(x)=\int\left(9e^x-\ln 4\bullet 4^x\right)dx$ $F(x)=9e^x-4^x+c$	3c. $f(x)=-2e^x+3\bullet 5^x$ $F(x)=\int\left(-2e^x+3\bullet 5^x\right)dx$ $F(x)=-2e^x+\frac{3}{\ln(5)}\bullet 5^x+c$
4a. $F(x)=\ln(x)+\frac{1}{x}+\frac{1}{x^2}$ $\frac{dF}{dx}=f(x)=\frac{1}{x}-\frac{1}{x^2}-\frac{2}{x^3}$	4b. $f(x)=\frac{7}{x}-\frac{1}{x^2}+\frac{2}{x^3}$ $F(x)=\int\left(\frac{7}{x}-\frac{1}{x^2}+\frac{2}{x^3}\right)dx$ $F(x)=7\ln\lvert x\rvert+\frac{1}{x}-\frac{1}{x^2}+c$	4c. $f(x)=\frac{6}{x^4}+\frac{10}{x^3}+\frac{5}{x}$ $F(x)=\int\left(\frac{6}{x^4}+\frac{10}{x^3}+\frac{5}{x}\right)dx$ $F(x)=-\frac{2}{x^3}-\frac{5}{x^2}+5\ln\lvert x\rvert+c$
5a. $F(x)=\tan(x)+\sec(x)$ $\frac{dF}{dx}=f(x)=\sec^2 x+\sec x\tan x$	5b. $f(x)=4\sec^2 x-7\sec x\tan x$ $F(x)=\int\left(4\sec^2 x-7\sec x\tan x\right)dx$ $F(x)=4\tan x-7\sec x+c$	5c. $f(x)=-3\sec^2 x+8\sec x\tan x$ $F(x)=\int\left(-3\sec^2 x+8\sec x\tan x\right)dx$ $F(x)=-3\tan x+8\sec x+c$
6a. $F(x)=\cot(x)+\csc(x)$ $\frac{dF}{dx}=f(x)=-\csc^2 x-\csc x\cot x$	5b. $f(x)=-5\csc^2 x+2\csc x\cot x$ $F(x)=\int\left(-5\csc^2 x+2\csc x\cot x\right)dx$ $F(x)=5\cot x-2\csc x+c$	5c. $f(x)=2\csc^2 x-9\csc x\cot x$ $F(x)=\int\left(2\csc^2 x-9\csc x\cot x\right)dx$ $F(x)=-2\cot x+9\csc x+c$
7a. $F(x)=\sqrt{x}+\sqrt[3]{x}$ $\frac{dF}{dx}=f(x)=\frac{1}{2\sqrt{x}}+\frac{1}{3\sqrt[3]{x^2}}$	7b. $f(x)=\frac{7}{2\sqrt{x}}-\frac{5}{3\sqrt[3]{x^2}}$ $F(x)=\int\left(\frac{7}{2\sqrt{x}}-\frac{5}{3\sqrt[3]{x^2}}\right)dx$ $F(x)=7\sqrt{x}+3\sqrt[3]{x}+c$	7c. $f(x)=\frac{-9}{\sqrt{x}}+\frac{8}{\sqrt[3]{x^2}}$ $F(x)=\int\left(-\frac{9}{\sqrt{x}}+\frac{8}{\sqrt[3]{x^2}}\right)dx$ $F(x)=-18\sqrt{x}+24\sqrt[3]{x}+c$
8a. $F(x)=\arctan x+\arcsin x$ $\frac{dF}{dx}=f(x)=\frac{1}{1+x^2}+\frac{1}{\sqrt{1-x^2}}$	8b. $f(x)=\frac{-2}{1+x^2}+\frac{3}{\sqrt{1-x^2}}$ $F(x)=\int\left(\frac{-2}{1+x^2}+\frac{3}{\sqrt{1-x^2}}\right)dx$ $F(x)=-2\tan^{-1}x+3\sin^{-1}x+c$	8c. $f(x)=\frac{10}{5+5x^2}-\frac{6}{\sqrt{4-4x^2}}$ $F(x)=\int\left(\frac{10}{5+5x^2}-\frac{6}{\sqrt{4-4x^2}}\right)dx$ $F(x)=2\tan^{-1}x-3\sin^{-1}x+c$