MAC2311: Test 4 Review

1. a. $f(x)=x^5$

$$\int x^5\,dx = \frac{x^6}{6}+C$$

1.b. $f(x)=3x^2-\frac{2}{x^2}=3x^2-2x^{-2}$

$$\int (3x^2-2x^{-2})\,dx = \frac{3x^3}{3}-\frac{2x^{-1}}{-1}+C$$

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

1c. $f(x)=\cos(4x)$

$$\int \cos(4x)\,dx$$

$$= \frac{4}{4}\int \cos(4x)\,dx$$

$$= \frac{1}{4}\int \cos(4x)\,4dx$$

$$= \frac{1}{4}\sin(4x)+C$$

1d. $f(x) = \sqrt[3]{x}+\sec^2(x)+\sec(x)\tan$

$f(x) = x^{1/3}+\sec^2(x)+\sec(x)\tan(x$

$$\int (x^{1/3}+\sec^2(x)+\sec(x)\tan(x))\,dx$$

$$= \frac{x^{4/3}}{4/3}+\tan x+\sec x+C$$

$$= \frac{3}{4}x^{4/3}+\tan x+\sec x+C$$

2a. $\int (4x^5-3x^3+\frac{1}{2}x-1)\,dx$

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

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

2b. $\int (x^3\sqrt[3]{x})\,dx$

$$= \int (x^3\cdot x^{1/3})\,dx$$

$$= \int x^{10/3}\,dx$$

$$= \frac{x^{13/3}}{13/3}+C$$

$$= \frac{3}{13}x^{13/3}+C$$