Name: *Caleb McWhorter — Solutions* **Quiz 1:** u**-Sub**
MAT 296 **Fall 2017**

Problem 1: Perform the following integration:

$$\int \frac{e^{x^{2/3}}}{\sqrt[3]{x}}\, dx$$

Let $u = x^{2/3}$. *Then we have*

$$u = x^{2/3}$$
$$du = \frac{2}{3}x^{-1/3}\, dx = \frac{2}{3\sqrt[3]{x}}\, dx$$
$$dx = \frac{3}{2}\sqrt[3]{x}\, du$$

$$\int \frac{e^{x^{2/3}}}{\sqrt[3]{x}}\, dx = \int \frac{e^u}{\sqrt[3]{x}} \cdot \frac{3}{2}\sqrt[3]{x}\, du = \int \frac{e^u}{\cancel{\sqrt[3]{x}}} \cdot \frac{3}{2}\cancel{\sqrt[3]{x}}\, du = \frac{3}{2}\int e^u\, du = \frac{3}{2}e^u + C = \frac{3}{2}e^{x^{2/3}} + C$$

Problem 2: Integrate the following:

(a) $\displaystyle\int \sin 2x\, dx = \frac{-\cos 2x}{2} + C$

(b) $\displaystyle\int e^{\frac{5}{3}x}\, dx = \frac{3}{5}e^{\frac{5}{3}x} + C$

(c) $\displaystyle\int \sqrt{7x+1}\, dx = \frac{2}{21}(7x+1)^{3/2} + C$

(d) $\displaystyle\int \frac{3}{1-2x}\, dx = -\frac{3}{2}\ln|1-2x| + C$

(e) $\displaystyle\int (5x-7)^{10}\, dx = \frac{(5x-7)^{11}}{55} + C$

(f) $\displaystyle\int \sqrt[5]{(7x+8)^6}\, dx = \frac{5}{77}\sqrt[5]{(7x+8)^{11}} + C$

(g) $\displaystyle\int \cos(\sqrt[9]{\pi}x)\, dx = \frac{\sin(\sqrt[9]{\pi}x)}{\sqrt[9]{\pi}} + C$

(h) $\displaystyle\int \pi^5 e^{15/7}\, dx = \pi^5 e^{15/7}x + C$