

**Integration Worksheet 1**  
**Show ALL work**

**MATH 2414 - Calculus II**  
**Marcus McGuff (NRG)**

**Important note:** In the answers, log always refers to the natural log (i.e., ln). Please continue to use ln in your work. (Also, of course, you may have to do a little simplification or factoring to match your answers with the provided answers here. You are also responsible for supplying your own +C's. I have to conserve my C's; my printer is almost out of that ink...)

1)  $\int \frac{\ln(x)}{x} dx$

$$\frac{\log^2(x)}{2}$$

2)  $\int (2x - 1) \sqrt{3x - 5} dx$

$$\frac{2}{135} (-5 + 3x)^{3/2} (5 + 18x)$$

3)  $\int \frac{1}{\sqrt{e^{2x} - 1}} dx$

$$\tan^{-1}(\sqrt{-1 + e^{2x}})$$

4)  $\int \frac{1}{x(\ln^2(x) + 4)} dx$

$$\frac{1}{2} \tan^{-1}\left(\frac{\log(x)}{2}\right)$$

5)  $\int \operatorname{arcsec}(x) dx$

$$x \sec^{-1}(x) - \log\left(\sqrt{\frac{x^2 - 1}{x^2}} x + x\right)$$

6)  $\int x^3 \cos(x) dx$

$$\sin(x) x^3 + 3 \cos(x) x^2 - 6 \sin(x) x - 6 \cos(x)$$

7)  $\int \sin^2(x) \cos^3(x) dx$

$$\frac{\sin^3(x)}{3} - \frac{\sin^5(x)}{5}$$

8)  $\int \frac{1}{(x^2 - 4)^2} dx$

$$\frac{1}{32} \left( -\log(x-2) + \log(x+2) - \frac{2}{x-2} - \frac{2}{x+2} \right)$$

$$9) \int \sqrt{5-x^2} \, dx$$

$$\frac{1}{2} \sqrt{5-x^2} \, x + \frac{5}{2} \sin^{-1} \left( \frac{x}{\sqrt{5}} \right)$$

$$10) \int \frac{x^3}{\sqrt{4-x^2}} \, dx$$

$$-\frac{1}{3} \sqrt{4-x^2} (x^2 + 8)$$

$$11) \int \frac{x^5 - 4x^2}{x^2 - 1} \, dx$$

$$\frac{1}{4} (x^4 + 2x^2 - 16x - 6 \log(x-1) + 10 \log(x+1))$$

$$12) \int \ln(6x) \, dx$$

$$x \log(6x) - x$$

$$13) \int \frac{x-1}{x^3-8} \, dx$$

$$\frac{1}{4} \sqrt{3} \tan^{-1} \left( \frac{x+1}{\sqrt{3}} \right) + \frac{1}{12} \log(x-2) - \frac{1}{24} \log(x^2 + 2x + 4)$$

$$14) \int \sec^6(x) \tan^5(x) \, dx$$

$$\frac{\sec^{10}(x)}{10} - \frac{\sec^8(x)}{4} + \frac{\sec^6(x)}{6} \text{ OR } \frac{\tan^{10}(x)}{10} + \frac{\tan^8(x)}{4} + \frac{\tan^6(x)}{6}$$

$$15) \int \sin^4(x) \, dx$$

$$\frac{1}{32} (12x - 8 \sin(2x) + \sin(4x))$$

$$16) \int \frac{x+5}{x^4-x^2} \, dx$$

$$3 \log(x-1) - \log(x) - 2 \log(x+1) + \frac{5}{x}$$