**MA 2310: Introduction to the Antiderivative**

| **Derivative Rule** | **Antiderivative Rule** |
|---|---|
| $\frac{d}{dx}\left[x^n\right] = nx^{n-1}$ | $\int x^n\,dx = \frac{x^{n+1}}{n+1} + C$ when $n \neq -1$ |
| $\frac{d}{dx}\left[\ln(x)\right] =$ | |
| $\frac{d}{dx}\left[e^x\right] =$ | |
| $\frac{d}{dx}\left[\sin(x)\right] =$ | |
| $\frac{d}{dx}\left[\cos(x)\right] =$ | |
| $\frac{d}{dx}\left[\tan(x)\right] =$ | |
| $\frac{d}{dx}\left[\sec(x)\right] =$ | |
| $\frac{d}{dx}\left[\cot(x)\right] =$ | |
| $\frac{d}{dx}\left[\csc(x)\right] =$ | |
| $\frac{d}{dx}\left[\sin^{-1}(x)\right] =$ | |
| $\frac{d}{dx}\left[\sec^{-1}(x)\right] =$ | |
| $\frac{d}{dx}\left[\tan^{-1}(x)\right] =$ | |

Compute

1. $\int x^3 + x + 1\,dx$
2. $\int x^2(4x^3 + x)\,dx$
3. $\int x^{-3} + x^{-1}\,dx$
4. $\int \frac{3x^3 + 4x}{5x}\,dx$
5. $\int \frac{2x^3 + 4x - 3}{x}\,dx$
6. $\int 5\cos(x) - 7\sin(x)\,dx$
7. $\int \frac{1}{3\sqrt{1-x^2}}\,dx$
8. $\int \frac{4}{x\sqrt{x^2-1}}\,dx$
9. $\int \frac{x}{x^3 + x}\,dx$
10. $\int 3\csc^2(x) + 2\sec(x)\tan(x)\,dx$