1. Compute $\int_0^{\pi/2} \cos^3(x)\sin(x)\,dx$

2. Compute $\int \cos(x)\sin(\sin(x))\,dx$

3. Compute $\int \frac{1}{9+x^2}\,dx$

4. Compute $\int \sqrt{x}(x^4 + x)\, dx$

5. Compute $\int x\sqrt{x-1}\, dx$

6. Compute $\int_1^3 \frac{(\ln(x))^3}{x}\, dx$

7. Compute $\dfrac{d}{dx}\left[x\ln(x) - x\right]$. Then compute $\int s^2 \ln(s^3)\, ds$

8. Compute $\displaystyle\int \cot(\theta)\, d\theta$

9. Compute $\displaystyle\int x(x+1)^{1/4} dx$

10. Challenge! Compute

$$\frac{d}{dx}\int_5^{x^3} \cos(\sqrt{s})\, ds.$$

Hint: Let $H(x) = \int_5^x \cos(\sqrt{s})\, ds$. You're interested in $H(x^3)$. Apply the Chain Rule!

11. Challenge! Compute

$$\frac{d}{dx}\int_x^{x+1} \sqrt{s^2+1}\, ds.$$