1. Find the first 30 digits of $\pi$ (count carefully!).

2. In the next chapter we’ll find that the $x$ coordinate of the center of mass of the first-quadrant portion of a unit circle with uniform density centered at the origin is given by 
   \[ \frac{\int_0^1 x \sqrt{1 - x^2} \, dx}{\int_0^1 \sqrt{1 - x^2} \, dx} \].
   Find a decimal approximation of this value to two decimal places, and explain whether you find your result plausible or not.

3. Find a formula for $\int_0^1 x^n \, dx$ in terms of the value of $n$ for any natural number $n$. [You’re encouraged to conjecture something based on evidence from the computer, but for full credit you need to provide some justification based on calculus.]

4. Find a formula for $\int_0^{\pi} \sin^n \theta \, d\theta$ in terms of the value of $n$ for any natural number $n$. [A guess is enough this time!]

5. Find a formula for $\int\left(\ln x\right)^n x \, dx$ in terms of the value of $n$ for any natural number $n$. [You’re encouraged to conjecture something based on evidence from the computer, but for full credit you need to provide some justification based on calculus.]