1. (a) Investigate: For which values of the power p is the integral $\displaystyle\int_1^{+\infty} \frac{1}{x^p}\, dx$ convergent?

2. Compute (carefully!) $\displaystyle\int_0^2 \frac{1}{(x-1)^2}\, dx$.

3. As explained in Pb. 60 of section 7.8, the improper integral

$$\int_0^{+\infty} x^3 e^{-a^2 x^2}\, dx$$

is important in computing the average speed of the molecules of an ideal gas. In the text you are asked to use technology to determine the precise value of this integral, but, perhaps, you have gained enough maturity to be able to do this by hand. Try it! It is a good exercise! (Hint: Think of a substitution first.)