1. Evaluate the following integrals:

   (a) $\int x\sqrt{x-1}dx \quad (u = x - 1)$

   (b) $\int x \, \tan(x^2) \, dx$

   (c) $\int \dfrac{1}{\sqrt{x} \, (\sqrt{x}+2)^3} \, dx$

2. Find the area of each region specified.

   (a) Between $y = 2\sin(x)\cos(x) + x$ and the x-axis for $0 \le x \le \pi$

   (b) Between $y = \dfrac{x}{2 + x^2}$ and the x-axis for $0 \le x \le 3$

   (c) Between $y = \dfrac{x}{2 + x}$ and the x-axis for $0 \le x \le 3$

   (d) Bounded by $y = x^3 - x$ and $y = 3x$

3. Find the average value of each function on the specified interval

   (a) $f(x) = x \sin(x^2)$ on $[0, \sqrt{\pi}]$

   (b) $f(x) = \cos(x)^4 \sin(x)$ on $[0, \pi]$

4. Evaluate the following definite integrals.
   If you cannot find an antiderivative, then estimate the value of the integral.

   (a) $\displaystyle\int_{-1}^{1} \sin(x) e^{x^2} \, dx$ (Hint: Look at the graph)

   (b) $\displaystyle\int_{-1}^{0} e^{x^2} \, dx$ (Hint: Think Taylor polynomials)