## Excercises 2

1. Compute the integrals
   (a) $\int \frac{\mathrm{e}^x}{4-3\mathrm{e}^x}\,\mathrm{d}x$
   (b) $\int \frac{\sin x}{1-\cos x}\,\mathrm{d}x$
   (c) $\int \frac{\sin 2x}{\sin^2 x+3}\,\mathrm{d}x$
2. Compute the integtals
   (a) $\int x^3\mathrm{e}^{-x^2}\,\mathrm{d}x$
   (b) $\int \arctan x\,\mathrm{d}x$
   (c) $\int \cos(\ln x)\,\mathrm{d}x$
   (d) $\int \frac{\ln x}{x}\,\mathrm{d}x$
   (e) $\int_0^{\frac{\pi}{2}} \mathrm{e}^{\cos x}\sin x\,\mathrm{d}x$
   (f) $\int_1^{\sqrt{3}} \arctan\frac{1}{x}\,\mathrm{d}x$
   (g) $\int \frac{2x+1}{x^2+2x+10}\,\mathrm{d}x$
3. Decide whether the following integrals converge or diverge
   (a) $\int_1^{\infty} \frac{3x-7}{x^2-4x+5}\,\mathrm{d}x$
   (b) $\int_0^1 \frac{\mathrm{e}^{\sqrt{x}}}{\sqrt{x}}\,\mathrm{d}x$
   (c) $\int_1^{\infty} \frac{1}{x^2+x}\,\mathrm{d}x$
   (d) $\int_1^{\infty} \ln x\,\mathrm{d}x$
4. Using trapezoidal method with step $h = 0,5$ estimate the length of the graph of the function
$$f(x) = \frac{x^2}{2},\ x \in [0,2].$$
5. Compute the area of the figure which is bounded by the $x-$axis and graph of the function
$$f(x) = \frac{\ln x}{\sqrt{x}},\ x \in (0,\mathrm{e}).$$
   Draw the figure.