# Line integral

1. Find a parametrization of a line segment $AB$ where $A = [1; 2; 4]$ and $B = [3; -1; 7]$. Verify that your parametrization is correct by using the theorem from the lecture.
2. Given a curve $C_1$ as a segment of the function $y = 1/x$ for $1 \leq x \leq 2$.
   (a) Suggest its parametrization.
   (b) Verify that the suggested parametrization is correct.
   (c) Compute the length of the tangent vector to the parametrization.
3. Given a curve $C_2$ as a segment of the function $y = \sqrt{x}$ for $0 \leq x \leq 4$.
   (a) Suggest its parametrization (and verify it is the correct one).
   (b) Compute the length of the tangent vector to the parametrization.
4. Consider a parametrization $P(t) = (t^2; t^3);\ t \in \langle 0; 1 \rangle$.
   (a) Write the parametric equations of the curve and verify that $P(t)$ is correctly def.
   (b) Suggest another (correct) parametrization of the same curve.
   (c) Compute the length of the curve.
5. For $f(x, y) = 2x^6 y$ and curve from example number 2. compute:
$$\int_{C_1} f \, \mathrm{d}s = ?$$
6. Compute the mass of the curve $\{[x, y] \in \mathbb{R}^2 :\ x^2 + y^2 = 9 \ \wedge\ x \geq 0 \ \wedge\ y \geq 0\}$ when the linear density is $\rho(x, y) = x$.
7. Compute the mass of the curve $\{[x, y, z] \in \mathbb{R}^3 :\ x^2/9 + y^2/25 = 1 \ \cap\ 4x - 3z = 0\}$ when the linear density is $\rho(x, y, z) = z^2$.