# PROBLEM SET 10: CURVE SKETCHING

Note: Most of the problems were taken from the textbook [1].

**Problem 1.** *Sketch the graph of the following functions showing vertical and horizontal asymptotes, intervals of increase/decrease, local maximum and minimum values, intervals of concavity, and inflection points.*

*a)* $f(x) = 1 + 1/x - 1/x^2$;

*b)* $y = e^{-x^2}$;

*c)* $g(x) = x - \frac{1}{6}x^2 - \frac{2}{3}\ln x$.

**Problem 2.** *Show that the curve* $(1 + x)/(1 + x^2)$ *has three points of inflection and they all lie on one straight line.*

**Problem 3.** *Sketch the graph of the following functions showing domain, intercepts, symmetry, asymptotes, intervals of increase/decrease, local maximum and minimum values, intervals of concavity, and inflection points.*

*a)* $f(x) = \frac{\sin x}{1+\cos x}$;

*b)* $y = \ln(1 + x^3)$;

*c)* $g(x) = e^{\arctan x}$.

## References

[1] J. Stewart: *Single Variable Calculus* 8th Edition, Cengage Learning, Boston 2015.