

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.