

Problem Set 2**due: May 26**

1. Recommended practice problems from Appendix D and Sections 1.4, 1.5, and 2.2.

2. Show that

$$\ln((\csc(\arctan(\sqrt{e})))^2) = \ln(1 + e) - 1.$$

3. Prove the following trigonometric identities:

(a) $\cos(4\alpha) = 8\cos^4\alpha - 8\cos^2\alpha + 1;$

(b) $\cos^2\alpha - \sin^2\beta = \cos(\alpha + \beta) \cdot \cos(\alpha - \beta);$

(c) $\sin^2\alpha - \sin^2\beta = \sin(\alpha + \beta) \cdot \sin(\alpha - \beta).$

4. Find the limit $\lim_{x \rightarrow 0} [\ln(\sin(2x)) - \ln x]$. Justify your answer.