Math 210 E   Spring 2013
Homework 5   Drew Armstrong

Reading:
  Sections 2.5 and 2.7 (We will skip 2.6)

Problems:
  Section 2.4:   32, 34
  Section 2.5:   2, 3, 4, 23, 28, 29

Additional Problems:

A.1. The following matrix rotates the plane counterclockwise by angle θ:
$$R_\theta := \begin{pmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{pmatrix}.$$

(a) Find the matrices R_{30°, R_{45°, R_{60° and R_{90°.

(b) Give a geometric reason why for all angles α, β we have
$$R_\alpha R_\beta = R_{\alpha+\beta}.$$
[Hint: You don't need to do any calculations.]

(c) Use part (b) to prove the trigonometric angle sum formulas:
$$\begin{cases} \cos(\alpha+\beta) = \cos\alpha\cos\beta - \sin\alpha\sin\beta \\ \sin(\alpha+\beta) = \cos\alpha\sin\beta + \sin\alpha\cos\beta \end{cases}$$
[This is **why** the angle sum formulas are true.]