# Homework and Quiz 2

Due Friday, June 26, 2009

## Ungraded homework

For practice at home, might I recommend:

Section 11.3, page 683, problems 3, 5, 9, 13, 27, 31, 37.
Section 13.1, page 805, problems 3, 7, 13, 15, 17, 19, 33.
Section 13.2, page 813, problems 5, 13, 15, 21, 23, 25, 37.

The answers to these problems appear in the back of your textbook; the problems in section 13.2 may be very difficult, but do not worry—we will be doing much, much more practice with vectors in the week to come!

## Graded Quiz

**(a)** Graph the curve $r = \cos(2\theta)$. Give the cartesian coordinates for three points on this curve where the tangent line to the curve is horizontal.

**(b)** Here are three points in $\mathbb{R}^3$:

$$
\begin{aligned}
A &= (2, -1, 0), \\
B &= (4, 1, 1), \\
C &= (4, -5, 4).
\end{aligned}
$$

Find the lengths between all these points; do they form a right triangle?

**(c)** The points $(x, y, z) \in \mathbb{R}^3$ for which

$$x^2 - 2x + y^2 - 4y + z^2 - 6z - 2 = 0$$

lie on a sphere: what is this sphere's center and radius?

**(d)** Here are some vectors in $\mathbb{R}^2$.

$$u = (-3, 2), \quad v = (1, 3), \quad w = (5, 2).$$

Can you write $u$ as $\alpha v + \beta w$ for some real numbers $\alpha$ and $\beta$?

**(e)** Here are some vectors in $\mathbb{R}^3$.

$$u = (4, 4, 4), \quad v = (2, 1, 3), \quad w = (3, 3, 1).$$

In this case, can you write $u$ as $\alpha v + \beta w$ for some real numbers $\alpha$ and $\beta$?